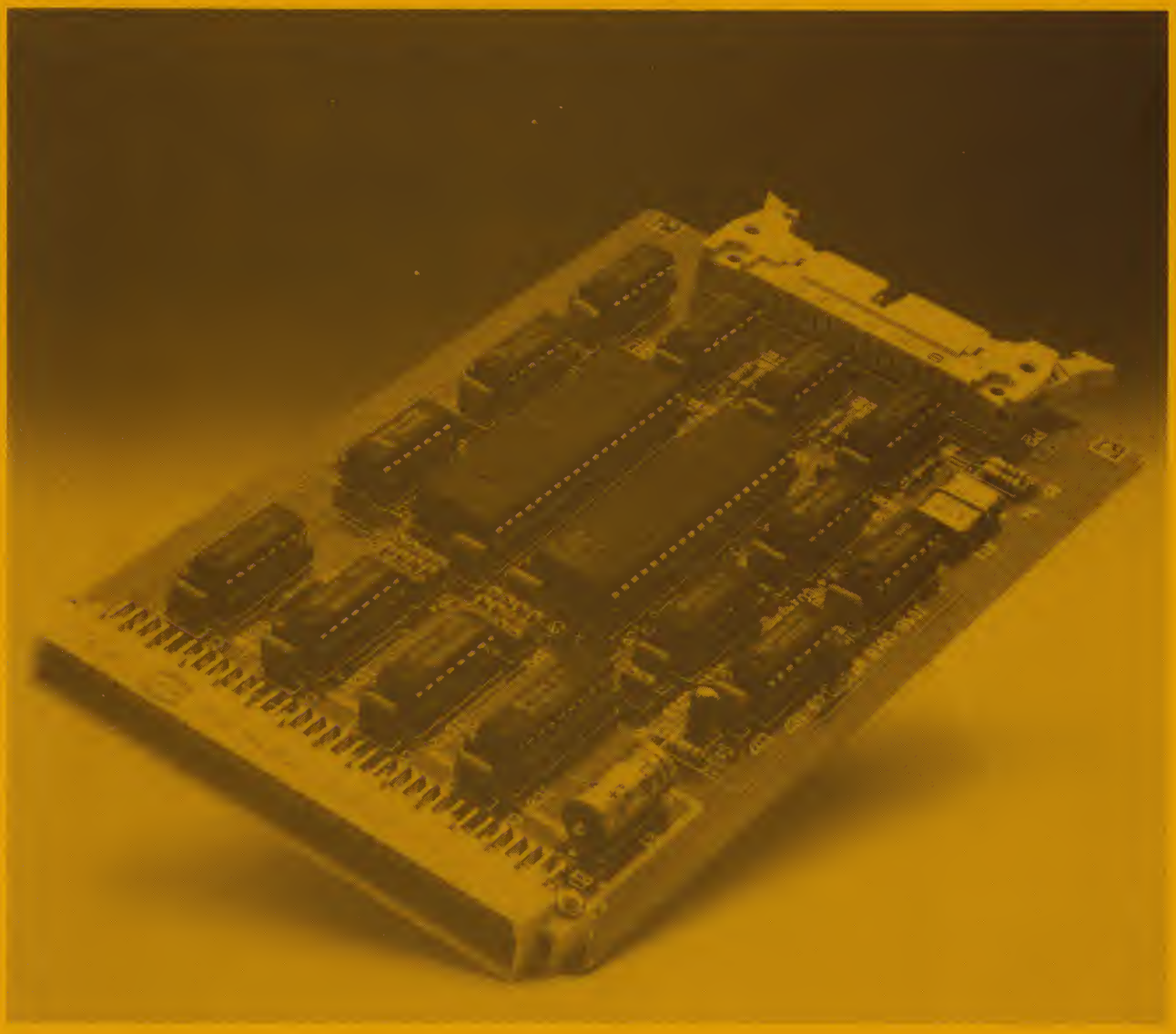
DE 6502 KENNER 51



Elfde Jaargang, Nr. 4
Augustus 1987

DE 6502 KENNER

** DE 6502 KENNERS ** — EEN CLUB VOOR 6XXXX GEBRUIKERS

De vereniging heeft leden in Nederland, Belgie, Duitsland, Frankrijk, Engeland, Denemarken, Noorwegen, Zweden, Spanje, Portugal, Oostenrijk, Finland, Amerika.
Het doel van de vereniging is: het bevorderen van de kennisuitwisseling tussen gebruikers van 6XXXX-computers, als COMMODORE-64, AMIGA, APPLE II/IIe/IIc/IIGS/III, MACINTOSH, ATARI 600/800XL/512/1024ST, CHE-1, PEARCOM, AIM-65, SYM, PET, BBC, VIC-20, BASIS 108, PROTON-computers, ITT-2020, OSI, ACC 8000, ACORN ELECTRON, SYSTEM 65, PC-100, PALLAS, MINTA, FORMOSA, ORIC-1, STARLIGHT, CV-777, ESTATE III, SBC65/68, KIM, NCS, KEMPAC SYSTEM-4, Elektuur-computers (JUNIOR, EC65(K) alias OCTOPUS), LASER, dus ook 6800, 6809 en 68000-computers.
De kennisuitwisseling wordt o.a. gerealiseerd door 6 maal per jaar DE 6502 KENNER te publiceren, door het houden van landelijke clubbijeenkomsten, door het instandhouden van een diskette-service en door het verlenen van paperware-service.

Verschijningsdata
DE 6502 KENNER 1985
derde zaterdag van
februari, april, juni,
augustus, oktober, december.

Bijeenkomsten van de club
derde zaterdag van
januari, maart, mei,
september, november.

Redaktie-adres en informatie over paperware etc.
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Jacob Jordaensstraat 15
2923 CK Krimpen/IJssel.
Tel.: 01807 - 19881

De vereniging is volledig onafhankelijk, is statutair opgericht en ingeschreven bij de Kamer van Koophandel en Fabrieken voor Hollands Noorderkwartier te Alkmaar, onder nummer 634305.

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** DE 6502 KENNER ** — EEN BLAD VOOR 6XXXX GEBRUIKERS

DE 6502 KENNER is een uitgave van de KIM Gebruikers Club Nederland. Het blad wordt verstrekt aan leden van de club. DE 6502 KENNER wordt van kopij voorzien door leden van de club, bij de opmaak van een publikatie bijgestaan door de redaktie. De inzendingen van programma's dienen voorzien te zijn van kommentaar in de listings en zo mogelijk door een inleiding voorafgegaan. Publikatie van een inzending betekent niet dat de redaktie of het bestuur enige aansprakelijkheid aanvaardt voor de toepassing ervan. De inzendingen kunnen geschieden in assembly-source-listings, in Basic, in Basicode, Forth, Focal, Comal, Pascal, Fortran, Cobol, Logo Elan, etc. etc.
De leden schrijven ook artikelen over de door hen ontwikkel de hardware en/of aanpassingen daarop. Zij schrijven tevens artikelen van algemene aard of reageren op publikaties van andere inzenders.

DE 6502 KENNER IS EEN BLAD VAN EN DOOR DE LEDEN

Micro-ADE Assembler/Disassembler/Editor is een produkt van Micro Ware Ltd., geschreven door Peter Jennings en bestemd voor alle 6502-computers. De KIM Gebruikers Club Ned. heeft de copyrights verworven nadat ons lid Sebo Woldringh de 4 K KIM-1 versie uitbreidde tot 8 K KIM-1 versie. Adri Hankel paste deze aan voor de JUNIOR. Willem L. van Pelt stelde een nieuwe 8 K source-listing voor de JUNIOR samen.
De implementatie op andere systemen dan de KIM-1 en JUNIOR kan eenvoudig gebeuren door het aanpassen van de I/O-adressen, welke in de source-listing gemakkelijk te vinden zijn

FATE Format-lister/cond. Assembler/Tape-utilities/Editor is de door ons lid Rob Banen geschreven source-listing van een 12 K universeel systeem voor de JUNIOR-computer aan de hand van het universele disk operating system van de fa. Proton Electronics te Naarden.
FATE wordt beschikbaar gesteld met toestemming van Proton.

DOS65 V2.01 is the new system of our club, build with Elektor's CPU, VDU, RAM-cards and our own professional Floppy-Disk-Controllercard for SS, DS, 40 or 80 tracks and a max. of 720 Kbytes capacity. For use with 6502 or 65C02.
For more information, write to E.J.M. Visschedijk
Dillenlaan 11
NL-7641 CX WIERDEN
The new DOS65 V2.01 is hardware compatible with Elektor's OCTOPUS/EC65 computer, except the controllercard.

In de edities van DE 6502 KENNER worden regelmatig mededelingen gedaan over de door de club georganiseerde bijeenkomsten. Ook worden bestuurlijke mededelingen gedaan, naast informaties over hetgeen in de handel te koop is. Leden die iets te koop hebben of iets zoeken kunnen dit in de edities van DE 6502 KENNER bekend maken. Ook worden brieven aan de redaktie gepubliceerd, evenals specifieke vragen van leden. De edities worden samengesteld op basis van een groot aantal prioriteiten, welke door een redaktievergadering worden gehanteerd. Deze vergadering bestaat uit de vaste medewerkers zoals in de colofon vermeld. Het aantal inzendingen is groter dan in een enkele editie van minimaal 48 pagina's is te verwerken. Hierdoor kan het voorkomen dat een inzending eerst na enige tijd kan worden gepubliceerd.

DE 6502 KENNER

De 6502 KENNER is een uitgave van de KIM gebruikers Club Nederland.

Adres voor het inzenden van en reakties op artikelen voor DE 6502 KENNER:
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en anderen.

DE 6502 KENNER verschijnt 6 x per jaar en heeft een oplage van 500 exemplaren.

De voorpagina is de DOS65-controllerkaart. ontwikkeld door Ad Brouwer.
CAD/CAM: E. Visschedijk.
i.s.m.: A. Hankel
Fotogr.: Fr. Visschedijk.

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DE 6502 KENNER

****
** **
** LANDELIJKE BIJEENKOMST DE 6502 KENNERS **
** **
****

Datum : zaterdag 19 september 1987
Lokatie : Wijkcentrum De Ringvaart
Floris van Adrichemlaan 98
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Tel.: 023 - 36 38 56

Routebeschrijving:

Wijkcentrum De Ringvaart is te bereiken:
- met het openbaar vervoer, vanaf het station Haarlem: N.Z.H. buslijn 7 - 71 - 72 - 77 - halte Floris van Adrichemlaan.

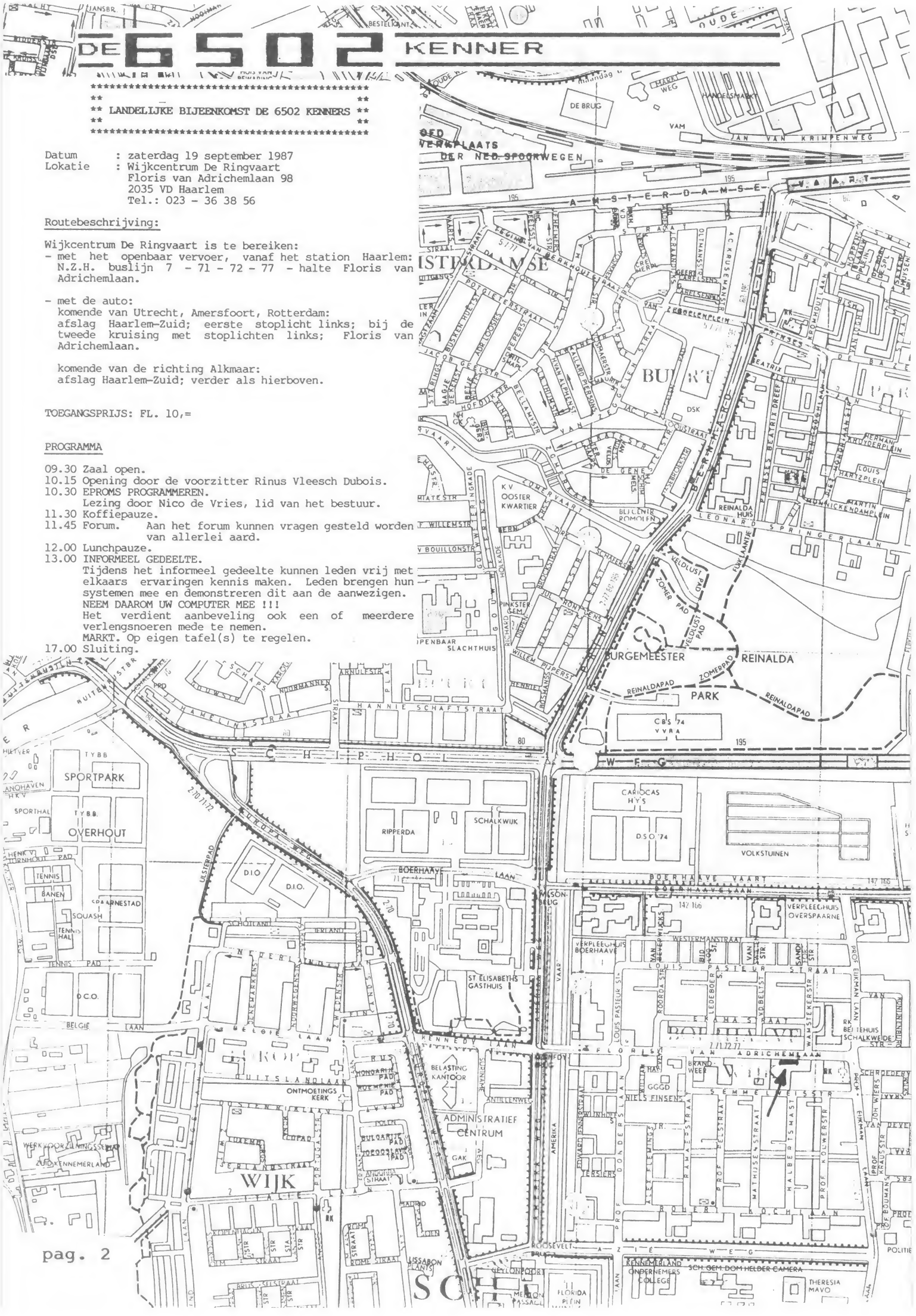
- met de auto:
komende van Utrecht, Amersfoort, Rotterdam:
afslag Haarlem-Zuid; eerste stoplicht links; bij de tweede kruising met stoplichten links; Floris van Adrichemlaan.

komende van de richting Alkmaar:
afslag Haarlem-Zuid; verder als hierboven.

TOEGANGSPRIJS: FL. 10,=

PROGRAMMA

09.30 Zaal open.
10.15 Opening door de voorzitter Rinus Vleesch Dubois.
10.30 EPROMS PROGRAMMEREN.
Lezing door Nico de Vries, lid van het bestuur.
11.30 Koffiepauze.
11.45 Forum. Aan het forum kunnen vragen gesteld worden van allerlei aard.
12.00 Lunchpauze.
13.00 INFORMEEL GEDEELTE.
Tijdens het informeel gedeelte kunnen leden vrij met elkaars ervaringen kennis maken. Leden brengen hun systemen mee en demonstreren dit aan de aanwezigen.
NEEM DAAROM UW COMPUTER MEE !!!
Het verdient aanbeveling ook een of meerdere verlengsnoeren mede te nemen.
MARKT. Op eigen tafel(s) te regelen.
17.00 Sluiting.



SIDEWAYS PRINTING ROUTINE for ATARI 520 ST

This programme has been written in FAST BASIC (Computer Concepts) and uses 1st WORD PLUS (GST) textfiles, it also requires a printer with quadruple density bit image graphics and the ability to line feed by '/216" ie. EPSON or compatible (I used an EPSON FX80)

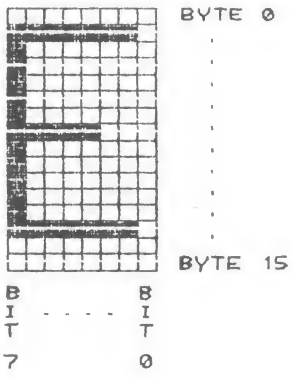
The maximum number of lines per page is 48 (line density is fixed at 8 lines per inch) and the line width is limited to 160 by 1st word plus. Although a page can have 48 lines it looks better if this is limited to 46 or less to allow a margin above and below the text. Blank lines at the end of a page have the effect of pushing text up, in the example printouts at the end of this article I have used 46 lines with one blank line to obtain an even margin above and below the text.

The routine can print in both Elite and Pica size text, however the pica density is not exactly the 10 CPI norm. and the gap between characters is less (This is largely due to resolution limits of the printer, which is also the reason why italics have not been included).

The character font used can either be the one resident in the programme (defined by data statements) or a font from DEGAS (BATTERIES INCLUDED). DEGAS is a drawing package which includes a font editor with several existing fonts. The 1st example at the end is printed with the resident font the second with computer font from disk.

Each character is defined in an 8 by 16 pixel grid (see diagram). Only characters 0 to 127 are defined, however most below 32 cannot be used as they are control characters for the word processor. I have used chr. 26 for the £ sign (1st word uses chr. 156)

The font file begins with character 0 and ends with character 127 with 16 bytes used for each character definition, the bytes are stored in the order indicated on the diagram.




```
DIM line$(48), style$(48), font%(128,16), b%(48,15), f3%(128,16,3)
infile% = FNfileselect( "B:\*.DOC", "*.DOC" )
ruler% = 0
PROCloadfont
OUT 0, 27, 40        :  REM reset printer
OUT 0, 27, 48        :  REM set 1/8" line spacing
OUT 0, 27, 67, 47    :  REM set form length to 47 lines (5 7/8" or half A4)
REPEAT
  PROCloadpage
  IF (ruler% <> 0) AND (fline% <> 0) THEN PROCprint
UNTIL EOF# infile%
CLOSE# infile%
END

DEF FNfileselect( P$, F$ )          :  REM P$ is default path name
  LOCAL ok%, infile%                :  REM F$ default filename and extension
  FSELECT P$, F$, ok%               :  REM file selector
  IF NOT ok% THEN END               :  REM end if 'cancel' was selected
  WHILE RIGHT$( P$, 1 ) <> "\"
    P$ = LEFT$( P$, LEN( P$ ) - 1 )
  WEND
  infile% = OPENIN ( P$+F$ )
  IF infile% < 0 THEN dummy% = ALERT("[1][ No such file ][ OK ]",1) : END
= infile%

DEF PROCsub
  PROCs_script
  OUT 0, 0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0, 0
ENDPROC
```

```
DEF PROCloadpage
  pica% = FALSE
  d$ = STRING$( 160, " " )
  d$ = ""
  s$ = STRING$( 160, " " )
  s$ = ""
  s¦ = 0
  fline% = 0
  REPEAT
    c¦ = BGET# infile% : REM load single byte from open file
    SWITCH c¦
      CASE 10 : c¦ = ASC( d$ )
                IF c¦ = $1F THEN
                  IF MID$( d$, 2, 2 ) = "9[" THEN
                    ruler% = INSTR( d$, "]" ) - 2
                    IF MID$( d$, ruler% + 3, 1 ) = "0" THEN pica% = TRUE
                    IF ruler% < 4 THEN ruler% = 0
                  ENDIF
                ELSE
                  fline% = fline% + 1
                  IF fline% > 48 THEN PRINT"more than 48 lines !":END
                  line$( fline% ) = d$
                  style$( fline% ) = s$
                ENDIF
                d$ = ""
                s$ = ""
      CASE 13 : REM ignor carriage return (LF is used as a line seperator)
      CASE 27 : s¦ = BGET# infile% : REM loads style change byte
      CASE 156: d$ = d$ + CHR$(26) : REM change   sign char.
                s$ = s$ + CHR$(s¦)
      DEFAULT : c¦ = c¦ AND 127
                IF (c¦ > 27) AND (c¦ < 31) THEN c¦ = 32 : REM convert all
                d$ = d$ + CHR$( c¦ ) : REM 'space' CHR's used by 1st WORD+ to " "
                s$ = s$ + CHR$( s¦ ) : REM add current byte & style from file to string
    ENDSWITCH
  UNTIL (EOF# infile%) OR (c¦ = 12)
ENDPROC

DEF PROCloadfont
  LOCAL chr, row, c¦, fontfile, fontfile%
  fontfile = ALERT("[2][ Load font file from disk ][ Yes ¦ No ]",1) - 2
  IF fontfile THEN fontfile% = FNfileselect( "A:\FONTS\*.FNT", "*.FNT" ) ELSE RESTORE
  FOR chr =0 TO 127
    FOR row = 0 TO 15
      IF fontfile THEN c¦ = BGET# fontfile% ELSE READ c¦
      font¦(chr,row) = c¦       : REM load PICA byte array
      IF c¦ AND 1 THEN f3¦(chr,row,1) = f3¦(chr,row,1) + 1
      IF c¦ AND 2 THEN f3¦(chr,row,3) = f3¦(chr,row,3) + 1
      IF c¦ AND 4 THEN f3¦(chr,row,2) = f3¦(chr,row,2) + 2
      IF c¦ AND 8 THEN f3¦(chr,row,1) = f3¦(chr,row,1) + 4
      IF c¦ AND 16 THEN f3¦(chr,row,3) = f3¦(chr,row,3) + 4
      IF c¦ AND 32 THEN f3¦(chr,row,2) = f3¦(chr,row,2) + 8
      IF c¦ AND 64 THEN f3¦(chr,row,1) = f3¦(chr,row,1) + 16
      IF c¦ AND 128 THEN f3¦(chr,row,3) = f3¦(chr,row,3) + 16
    NEXT row                    : REM convert to ELITE size text
  NEXT chr
  IF fontfile THEN CLOSE# fontfile%
ENDPROC
```

```
DEF PROCprint
  LOCAL lobyte%, hibyte%, col%, pass%, line%, c%, b¦, bl¦, s¦, u¦
  FOR line% = 1 TO fline%
    IF LEN(line$(line%))<ruler% THEN
      line$(line%) = line$(line%)+STRING$( ruler% - LEN(line$(line%))," " )
    ENDIF
    IF LEN(style$(line%))<ruler% THEN
      style$(line%) = style$(line%)+STRING$( ruler% - LEN(style$(line%)),CHR$(0) )
    ENDIF
    FOR i% = 0 TO 15
      b¦(line%,i%) = 0
    NEXT      : REM clear array used for emphasized text
  NEXT line%
  lobyte% = fline% * 40 : REM max. character height in bytes
  hibyte% = lobyte% DIV 256
  lobyte% = lobyte% MOD 256
  FOR col% = 1 TO ruler%
    FOR pass% = 3 TO 1 STEP - 1
      OUT 0, 27, 90, lobyte%, hibyte% : REM quadruple density selection
      FOR line% = fline% TO 1 STEP - 1
        s¦ = ASC(MID$(style$(line%),col%,1))
        IF pica% THEN u¦ = 255 ELSE u¦ = 63 : REM set underline width
        IF (s¦ AND 8) = 0 THEN u¦ = 0       : REM inhibit underline
        IF pass% <> 3 THEN
          IF (s¦ AND 1) = 0 THEN u¦ = 0
          IF (pass% = 1) AND (pica% = FALSE) THEN u¦ = 0
        ENDIF
        OUT 0, 0,0,0,0,0,0,0,u¦ : REM space between lines
        c% = ASC(MID$(line$(line%),col%,1))
        IF (s¦ AND 16) THEN
          PROCsuper             : REM superscript
        ELSE
          IF (s¦ AND 32) THEN
            PROCsub             : REM subscript
          ELSE
            PROCfull            : REM full size text
          ENDIF
        ENDIF
      NEXT line%
      OUT 0, 27,51,1, 13,10     : REM feed 1/216th inch only
    NEXT pass%
    IF pica% THEN
      OUT 0, 27,51,20           : REM set paper feed for PICA
    ELSE
      OUT 0, 27,51,15           : REM set paper feed for ELITE
    ENDIF
    OUT 0, 13,10                : REM CR LF
  NEXT col%
  OUT 0, 12                     : REM form feed to next page
ENDPROC

DEF PROCsuper
  OUT 0, 0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0, 0
  PROCs_script
ENDPROC
```

```
DEF PROCfull
  FOR i% = 15 TO 0 STEP - 1
    IF pica% THEN
      IF pass% = 3 THEN b¦ = font¦( c%, i% ) ELSE b¦ = 0
    ELSE
      b¦ = f3¦( c%, i%, pass% )
    ENDIF
    b1% = b¦(line%,i%)     : REM emphasize text
    b¦(line%,i%) = b¦      : REM      - " -
    IF (s¦ AND 1) THEN b¦ = (b¦ OR b1%)
    IF pass% = 1 THEN b¦(line%,i%) = 0
    OUT 0, 0, b¦
  NEXT i%
ENDPROC

DEF PROCs_script
  FOR i% = 15 TO 0 STEP - 1
    IF pica% THEN
      IF pass% = 3 THEN b¦ = font¦( c%, i% ) ELSE b¦ = 0
    ELSE
      b¦ = f3¦( c%, i%, pass% )
    ENDIF
    b1% = b¦(line%,i%)     : REM emphasize text
    b¦(line%,i%) = b¦      : REM      - " -
    IF (s¦ AND 1) THEN b¦ = (b¦ OR b1%)
    IF pass% = 1 THEN b¦(line%,i%) = 0
    OUT 0, b¦
  NEXT i%
ENDPROC

REM resident font defintion ( each line defines one character )
DATA 255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255
DATA 16,16,56,56,84,84,146,146,16,16,16,16,16,0,0,0
DATA 16,16,16,16,16,146,146,84,84,56,56,16,16,0,0,0
DATA 8,8,4,4,2,2,255,2,2,4,4,8,8,0,0,0
DATA 16,16,32,32,64,64,255,64,64,32,32,16,16,0,0,0
DATA 126,126,60,60,153,153,195,195,195,195,153,153,60,60,126,126
DATA 255,255,255,255,254,254,253,253,251,251,247,247,239,239,223,223
DATA 238,238,238,198,198,146,146,56,56,146,146,198,198,238,238,238
DATA 0,0,1,1,2,2,4,4,136,136,80,80,32,32,0,0
DATA 124,130,162,162,162,162,186,130,130,130,130,130,124,0,0,0
DATA 24,24,60,60,60,60,60,60,126,126,16,16,56,56,16,16
DATA 8,8,12,12,10,10,8,8,56,120,120,120,48,0,0,0
DATA 252,128,128,128,254,144,144,144,158,16,16,16,16,0,0,0
DATA 248,128,128,128,158,146,146,146,254,20,20,18,18,0,0,0
DATA 5,5,5,5,5,5,5,5,9,9,17,17,97,97,0,0
DATA 160,160,160,160,160,160,160,160,144,144,136,136,134,134,0,0
DATA 60,66,66,66,66,66,0,66,66,66,66,66,60,0,0,0
DATA 0,2,2,2,2,2,0,2,2,2,2,2,0,0,0,0
DATA 60,2,2,2,2,2,60,64,64,64,64,64,60,0,0,0
DATA 60,2,2,2,2,2,60,2,2,2,2,2,60,0,0,0
DATA 0,66,66,66,66,66,60,2,2,2,2,2,0,0,0,0
DATA 60,64,64,64,64,64,60,2,2,2,2,2,60,0,0,0
DATA 60,64,64,64,64,64,60,66,66,66,66,66,60,0,0,0
DATA 60,2,2,2,2,2,0,2,2,2,2,2,0,0,0,0
DATA 60,66,66,66,66,66,60,66,66,66,66,66,60,0,0,0
DATA 60,66,66,66,66,66,60,2,2,2,2,2,60,0,0,0
DATA 12,18,33,32,32,32,120,32,32,32,32,32,127,0,0,0
```

```
DATA 248,128,128,128,240,128,128,128,254,16,16,16,30,0,0,0
DATA 170,85,170,85,170,85,170,85,170,85,170,85,170,85,170,85
DATA 255,0,255,0,255,0,255,0,255,0,255,0,255,0,255,0
DATA 170,170,170,170,170,170,170,170,170,170,170,170,170,170,170,170
DATA 68,68,136,136,17,17,34,34,68,68,136,136,17,17,34,34
DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
DATA 16,16,16,16,16,16,16,16,16,16,0,0,16,0,0,0
DATA 0,36,36,36,0,0,0,0,0,0,0,0,0,0,0,0
DATA 36,36,36,36,126,36,36,36,126,36,36,36,36,0,0,0
DATA 16,16,60,80,144,80,56,20,18,20,120,16,16,0,0,0
DATA 0,0,68,4,8,8,16,16,32,32,68,0,0,0,0,0
DATA 24,36,36,36,24,40,40,69,69,130,130,69,57,0,0,0
DATA 0,16,16,16,0,0,0,0,0,0,0,0,0,0,0,0
DATA 4,4,8,8,16,16,16,16,16,16,8,8,4,4,0,0
DATA 32,32,16,16,8,8,8,8,8,8,16,16,32,32,0,0
DATA 0,0,68,68,40,40,254,40,40,68,68,0,0,0,0,0
DATA 0,0,16,16,16,16,124,16,16,16,16,0,0,0,0,0
DATA 0,0,0,0,0,0,0,0,0,0,0,16,16,32,32,0
DATA 0,0,0,0,0,0,124,0,0,0,0,0,0,0,0,0
DATA 0,0,0,0,0,0,0,0,0,0,0,16,16,0,0,0
DATA 0,0,2,2,4,4,8,8,16,16,32,32,64,64,0,0
DATA 56,68,68,130,130,130,130,130,130,130,68,68,56,0,0,0
DATA 16,48,48,16,16,16,16,16,16,16,16,16,124,0,0,0
DATA 56,68,130,2,2,4,8,16,32,64,128,128,254,0,0,0
DATA 56,68,130,2,2,4,24,4,2,2,130,68,56,0,0,0
DATA 12,12,20,20,36,36,68,68,132,132,254,4,4,0,0,0
DATA 252,128,128,128,128,248,4,2,2,2,130,68,56,0,0,0
DATA 56,68,130,128,128,128,248,132,130,130,130,68,56,0,0,0
DATA 254,130,130,4,4,8,8,16,16,16,16,16,16,0,0,0
DATA 56,68,130,130,130,68,56,68,130,130,130,68,56,0,0,0
DATA 56,68,130,130,130,66,62,2,2,2,2,4,120,0,0,0
DATA 0,0,0,16,16,0,0,0,16,16,0,0,0,0,0,0
DATA 0,0,0,16,16,0,0,0,16,16,32,32,0,0,0,0
DATA 8,8,16,16,32,32,64,64,32,32,16,16,8,8,0,0
DATA 0,0,0,0,124,0,0,0,124,0,0,0,0,0,0,0
DATA 32,32,16,16,8,8,4,4,8,8,16,16,32,32,0,0
DATA 56,68,130,2,2,4,8,16,16,0,0,16,16,0,0,0
DATA 56,68,130,130,158,162,162,162,156,128,128,64,62,0,0,0
DATA 56,68,130,130,130,130,254,130,130,130,130,130,130,0,0,0
DATA 248,132,130,130,130,132,248,132,130,130,130,132,248,0,0,0
DATA 56,68,130,128,128,128,128,128,128,128,130,68,56,0,0,0
DATA 248,132,130,130,130,130,130,130,130,130,130,132,248,0,0,0
DATA 254,128,128,128,128,128,248,128,128,128,128,128,254,0,0,0
DATA 254,128,128,128,128,128,248,128,128,128,128,128,128,0,0,0
DATA 62,64,128,128,128,128,142,130,130,130,130,68,56,0,0,0
DATA 130,130,130,130,130,130,254,130,130,130,130,130,130,0,0,0
DATA 124,16,16,16,16,16,16,16,16,16,16,16,124,0,0,0
DATA 2,2,2,2,2,2,2,2,2,130,68,56,0,0,0
DATA 130,130,132,132,136,136,240,136,136,132,132,130,130,0,0,0
DATA 128,128,128,128,128,128,128,128,128,128,128,128,254,0,0,0
DATA 130,198,198,170,170,146,146,130,130,130,130,130,130,0,0,0
DATA 130,194,194,162,162,146,146,138,138,134,134,130,130,0,0,0
DATA 56,68,130,130,130,130,130,130,130,130,130,68,56,0,0,0
DATA 248,132,130,130,130,132,248,128,128,128,128,128,128,0,0,0
DATA 56,68,130,130,130,130,130,130,138,138,132,68,58,0,0,0
DATA 248,132,130,130,130,132,248,136,136,132,132,130,130,0,0,0
DATA 56,68,130,128,128,64,56,4,2,2,130,68,56,0,0,0
DATA 254,16,16,16,16,16,16,16,16,16,16,16,16,0,0,0
```

```
DATA 130,130,130,130,130,130,130,130,130,130,130,68,56,0,0,0
DATA 130,130,130,130,130,130,130,130,68,68,40,40,16,16,0,0,0
DATA 130,130,130,130,130,130,146,146,170,170,198,198,130,0,0,0
DATA 130,130,68,68,40,40,16,40,40,68,68,130,130,0,0,0
DATA 130,130,130,130,68,68,40,40,16,16,16,16,16,0,0,0
DATA 254,4,4,8,8,16,16,32,32,64,64,128,254,0,0,0
DATA 28,16,16,16,16,16,16,16,16,16,16,16,16,28,0,0,0
DATA 128,128,64,64,32,32,16,16,8,8,4,4,2,0,0,0
DATA 56,8,8,8,8,8,8,8,8,8,8,8,8,56,0,0,0
DATA 16,16,40,40,68,68,130,130,0,0,0,0,0,0,0,0
DATA 0,0,0,0,0,0,0,0,0,0,0,0,254,0,0,0
DATA 0,16,16,16,0,0,0,0,0,0,0,0,0,0,0,0
DATA 0,0,0,0,120,132,4,4,124,132,132,132,122,0,0,0
DATA 128,128,128,128,248,132,132,132,132,132,132,132,248,0,0,0
DATA 0,0,0,0,120,132,128,128,128,128,128,132,120,0,0,0
DATA 4,4,4,4,124,132,132,132,132,132,132,132,124,0,0,0
DATA 0,0,0,0,120,132,132,132,248,128,128,128,120,0,0,0
DATA 14,16,16,16,56,16,16,16,16,16,16,16,16,0,0,0
DATA 0,0,0,0,120,132,132,132,132,132,124,4,4,4,120,0
DATA 128,128,128,128,248,132,132,132,132,132,132,132,132,0,0,0
DATA 16,0,0,0,48,16,16,16,16,16,16,16,56,0,0,0
DATA 8,0,0,0,8,8,8,8,8,8,8,8,8,48,0
DATA 128,128,136,136,144,144,224,144,144,136,136,132,132,0,0,0
DATA 48,16,16,16,16,16,16,16,16,16,16,16,56,0,0,0
DATA 0,0,0,0,236,146,146,146,146,130,130,130,130,0,0,0
DATA 0,0,0,0,248,132,132,132,132,132,132,132,132,0,0,0
DATA 0,0,0,0,120,132,132,132,132,132,132,132,120,0,0,0
DATA 0,0,0,0,248,132,132,132,132,132,132,132,248,128,128,128
DATA 0,0,0,0,124,132,132,132,132,132,132,132,124,4,4,4
DATA 0,0,0,0,248,132,132,128,128,128,128,128,128,0,0,0
DATA 0,0,0,0,120,132,128,128,120,4,4,132,120,0,0,0
DATA 16,16,16,16,124,16,16,16,16,16,16,16,12,0,0,0
DATA 0,0,0,0,132,132,132,132,132,132,132,132,124,0,0,0
DATA 0,0,0,0,130,130,130,68,68,40,40,16,16,0,0,0
DATA 0,0,0,0,130,130,130,130,130,146,146,170,68,0,0,0
DATA 0,0,0,0,132,132,72,72,48,72,72,132,132,0,0,0
DATA 0,0,0,0,132,132,132,132,132,132,124,4,4,4,120,0
DATA 0,0,0,0,124,4,8,8,16,16,32,32,124,0,0,0
DATA 24,32,32,32,32,32,64,32,32,32,32,32,24,0,0,0
DATA 16,16,16,16,16,16,16,16,16,16,16,16,16,0,0,0
DATA 48,8,8,8,8,8,4,8,8,8,8,8,48,0,0,0
DATA 0,0,34,84,84,136,136,0,0,0,0,0,0,0,0,0
DATA 0,0,16,16,40,40,68,68,130,130,255,0,0,0,0,0
```

Elite size

!"£$%^&*()
_+{}[]<>/?#~
1234567890
ABCDEFGHIJ
KLMNOPQRST
UVWXYZ
abcdefghij
klmnopqrst
uvwxyz

Emphasized

superscripts
bold superscripts
subscripts
bold subscripts

Underline

5 3/4"

If 2 pages appear on your file the second will be printed on the right hand side of the paper offset from the first page by half the length of an A4 sheet.

Elite size

!"£$%^&*()
_+{}[]<>/?#~
1234567890
ABCDEFGHIJ
KLMNOPQRST
UVWXYZ
abcdefghij
klmnopqrst
uvwxyz

Emphasized

superscripts
bold superscripts
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5 3/4"

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CASSETTE MOTOR CONTROL AND BELL ON THE OCTOPUS/EC65

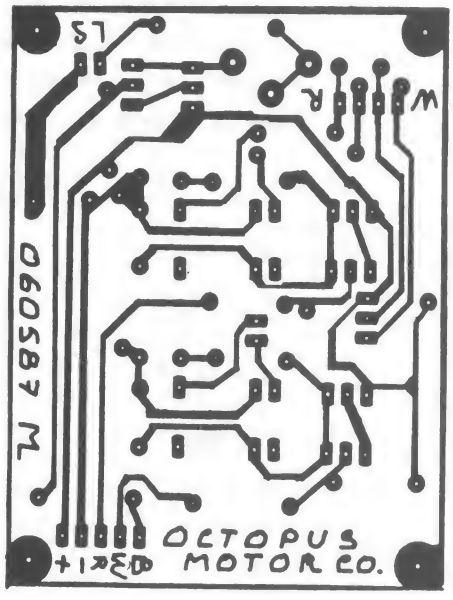
M. Lachaert.

In the 'Computer special' nr 1, Elektor published a well-working cassette interface card, as well for Kim/Jusior as for Basicode format. Unfortunately, they omitted to build in an important feature!The card had no possibilities at all to control the cassette motors on/off. The present circuitry remediates to this gap, and offers beside this a handy possibility to build in a 'bell' feature.

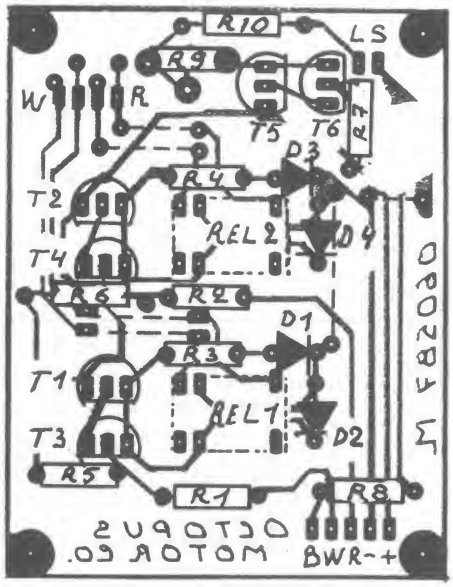
The circuit utilizes three free output lines of the port IC4 on the interface board as described by Elektor. Output S6 (pin 5) controls the 'write' recorder motor, output S7 (pin 4) controls the 'read' recorder motor, while output S8 (pin 3) feeds a small amplifier connected to a miniature speaker, featuring the bell.

The write control hardware and the read control hardware are two very similar PNP-darlington amplifiers, which have both a relay as load. As usual in case of inductive-loaded transistor design, D2 and D4 are incorporated to protect the transistors against inductive voltage peaks. The optional light emitting diodes D1 (red led = write) and D3 (green led = read) can be installed on the front of the computer to indicate the control state. Note that the resistors R3 and R4 are the sole non-identical parts in both write and read logic. This is due to the different working voltages between red and green leds.

I preferred to use single PNP-transistors, rather than real two-in-one-case darlingtons, because of their better availability. The printed circuit board has been designed for low-cost 5 Volt miniature relays, which are very well available too.

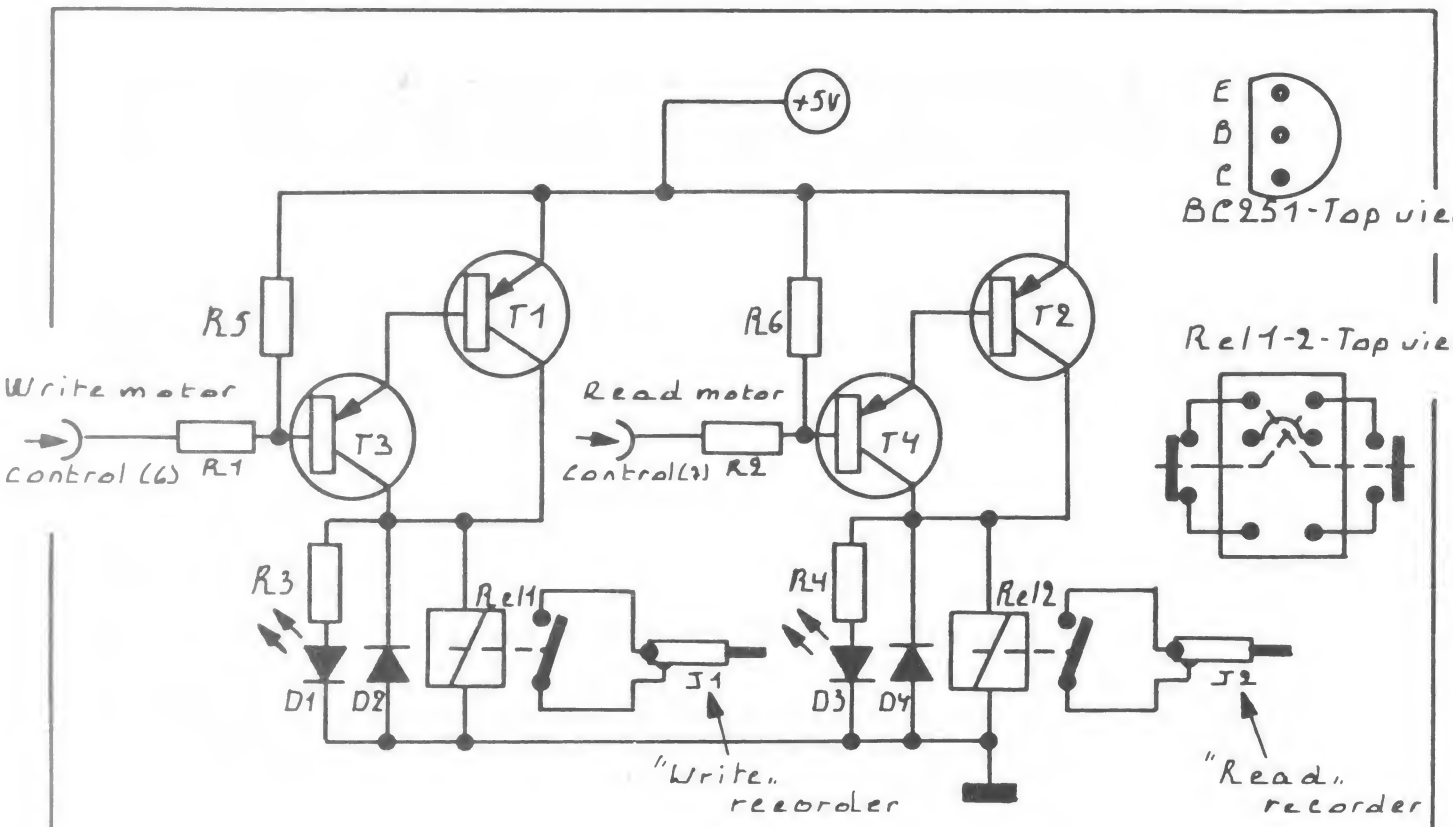


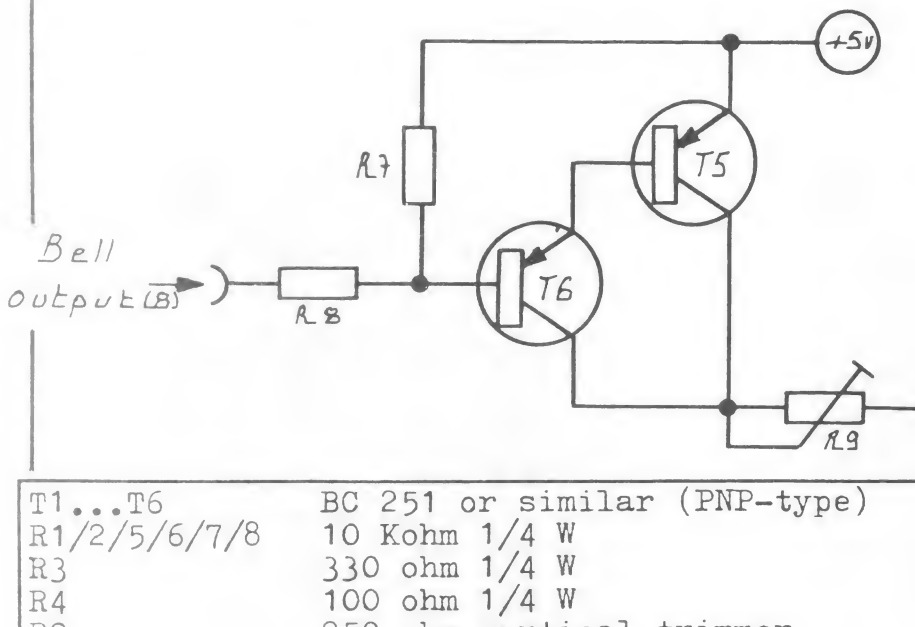
copper side



component side

The control hardware is in fact very simple. As long as the input pin of R1 (R2) remains on HI-level (5 V), the darlington is non-conducting. Even when this pin is open, nothing happens, because of the base of T3 (T4) is pulled HI by R5 (R6). Once the logical level on R1 (R2) is LO (less than 0.7 V), the darlington





Octopus-EC65

cassette motor control & bell output (extension of Kim-Basicode card)

M 060587

T1...T6	BC 251 or similar (PNP-type)
R1/2/5/6/7/8	10 Kohm 1/4 W
R3	330 ohm 1/4 W
R4	100 ohm 1/4 W
R9	250 ohm vertical trimmer
R10	4.7 ohm 1 W
D1	Led red
D3	Led green
D2/4	1N4148 or similar
Rel1/2	Miniature relay 5 V / 80 ohm
J1/2	Subminiature telephone jack
LS	Miniature loudspeaker 8 ohm 150 mW

goes in conduction, Rel1 (Rel2) closes and the selected recorder can start. This means that the control software must be written in order that a HI level (logical '1') must exist at the output lines S6 and S7 of IC4 on the Elektor interface board, as long as the recorders must be stopped. A LO level (logical '0') on output S6 starts the 'write' recorder, while a LO level on output S7 starts the 'read' recorder.

The 'bell' circuitry is even simple. While not operational, a HI level on R8 opens the darlington T5/T6. In operation, the 'bell' software must apply a square-wave in the audible spectrum (at best around 2000 Hertz) on output line 8 of IC4. This signal is buffered by the darlington, and the signal level can be regulated by R9, in order to avoid neighbour complaints...

In a 'normal' Octopus configuration, the KIM I/O port is adressed at $E280. An ennoying detail is that the output status of this port (in fact a simple latch...) can not be read out by the processor. So, for correct operation, the status of the port has to be copied somewhere in the memory, and at each change, this change has to be 'told' also to this 'slave' location.

A sample program that features all the controls described above can have the following form:

1. initialize the port:

```
INIZ     LDA #$FF    ; SET ALL HIGH ---> TURN OFF

SETPRT   STA KIMIO   ; SET/RESET THE DESIRES PORT BITS
         STA GANG    ; SAVE STATUS IN SLAVE LOCATION
         RTS         ; ALL DONE
```

2. turn the 'read' motor on:

```
READON   LDA GANG    ; FETCH PREVIOUS STATUS
         AND #$FE    ; 'READMOTOR' BIT = LOW ---> MOTOR ON
         JMP SETPRT  ; GO DO IT
```

3. turn the 'write' motor on:

```
WRON     LDA GANG    ; FETCH PREVIOUS STATUS
         AND #$CF    ; 'WRITEMOTOR' BIT = LOW --> MOTOR ON
         JMP SETPRT  ; GO DO IT
```

4. turn the 'read' motor off:

```
READOF   LDA GANG    ; FETCH PREVIOUS STATUS
         ORA #$40    ; 'READMOTOR' BIT = HIGH --> MOTOR OFF
         BNE SETPRT  ; GO DO IT
```

5. turn the 'write' motor off:

```
WROFF    LDA GANG    ; FETCH PREVIOUS STATUS
         ORA #$20    ; 'WRITEMOTOR' BIT = HIGH -> MOTOR OFF
         BNE SETPRT  ; GO DO IT
```

6. ring the bell:

```
BELL     LDA GANG    ; FETCH OLD PORT STATUS
         ORA #$80    ; SET BELL BIT
         LDY #$80    ; Y = # OF 1/2 PERIODES

TOGGLE   JSR SETPRT  ; CHANGE PORT
         LDX #$28    ; X = 1/2 PERIODE LENGHT

PERIOD   DEX         ; MAKE 1 PERIODE
         BNE PERIOD
         EOR #$80    ; TOGGLE BELL-BIT
         DEY         ; NEXT 1/2 PERIODE
         BNE TOGGLE  ; NOT YET LAST
         RTS         ; DONE
```

```
      ****************************************
      *  PRINTER INIT FOR ELECTRON AND BBC   *
      ****************************************
```

By: Ronald van Vugt (PA3EAH), The Netherlands

With this program you are able to set some options for a EPSON-printer. You'll see this options by typing *HELP. The program uses two pages of memory.

Met dit programma kunt u op een makkelijke manier verschillende instellingen op een EPSON-printer verwezelijken. Als u *HELP intikt ziet u alle mogelijkheden. Het programma beslaat precies 2 pagina's.

```
 10 REM Printer init for the ELECTRON and BBC
 20 REM By Ronald van Vugt (PA3EAH), The Netherlands
 30 REM-------------------------------------------
 40 REM startaddress next command
 50 commands_low=&72:commands_high=&73
 60 REM address from oscli (*command) vector
 70 save_vec_low=&70:save_vec_high=&71
 80 REM startaddress where a *command starts (in ASCII)
 90 oscli_low=&74:oscli_high=&75
100 len=&76:REM number of letters in a *command, flag
110         REM (0=command off, not 0=commando on),
120         REM flag (0=printer off, not 0=printer on)
130         REM and a temporary memory place
140 status=&77:REM bit 0 is 0=>pica, bit 0 is 1=>elite
150 REM bit 1=> proportional, bit 2=> compressed
160 REM bit 3=> emphasized, bit 4=> doublestrike
170 REM bit 5=> expanded, bit 6=> italics
180 REM bit 7=> underlining. bit=1 => option on
190                          REM bit=0 => option off
200 oswrch=&FFEE:REM to put the value from the
210               REM accumulator on the screen
220 osnewln=&FFE7:REM print a linefeed + carriage return
230 osbyte=&FFF4:REM invoking OS facilities
240 osasci=&FFE3:REM to put the value from the
250 REM accumulator on the screen. When A is 13
260 REM there'll be print a linefeed and carriage return
270 FOR pass%=0 TO 3STEP3
280 P%=&900:REM P%=&C000 if you've a 'TUBE'
290 [OPT pass% \pass%=0 => no error report
300           \pass%=3 => error report
310 .init
320 LDA &208:STA save_vec_low   \oscli_vector to
330 LDA &209:STA save_vec_high  \save_vec
340 LDA #search MOD256:STA &208 \startaddress form search
350 LDA #search DIV256:STA &209 \to oscli_vector
360 LDA #0:STA status           \all options off, pica
370 RTS
380 .search \when you typed a *command, the program
390         \jumps to search
400 \startaddress from commands to commands_low and high
410 LDA #commands MOD256:STA commands_low
420 LDA #commands DIV256:STA commands_high
430 \start from typed *command to oscli_low and high
440 STX oscli_low:STY oscli_high:LDX #0
450 .lus1
460 \number of letters from commando to len
470 LDY #0:LDA (commands_low),Y:STA len
480 .lus2
490 \next letter from commando.When * => commando found
500 INY:LDA (oscli_low),Y:CMP #ASC"*":BEQ true
510 \make capital from typed letter. When typed letter
520 \and letter from commando are not the same,not found
530 AND #223:CMP (commands_low),Y:BNE false
540 \when all letters from commando compared => found
550 CPY len:BNE lus2
560 .true
570 LDA #0:STA len   \flag (all options off)
580 CPX #9:BEQ reset \when X=9 => reset
590 CPX #10:BEQ help \when X=10 => help
600 .lus6
610 \remove all the spaces after your typed *commando
620 INY:LDA (oscli_low),Y:CMP #32:BEQ lus6
630 \take the second letter after the spaces. When it
640 \is a 'F' or 'f' (from oFf) set len (a flag)
650 INY:LDA (oscli_low),Y:AND #223
660 CMP #ASC"F":BNE no_on_off:STA len
670 .no_on_off
680 CPX #0:BNE no_pica \when X isn't 0 => no pica
690 \change status and send to printer
700 LDA #254:AND status:STA status:JMP printer
710 .no_pica
720 CPX #1:BNE no_elite \when X isn't 1 => no elite
730 \change status and send to printer
740 TXA:ORA status:STA status:JMP printer
750 .no_elite
760 \save len (a flag) to place it into Y
770 LDA #0:LDY len:SEC
780 .lus7
790 \set (X-1)th bit in A (when X=3, A becomes %00000100)
800 ROL A:CLC:DEX:BNE lus7
810 \when option on => jump to on
820 STA len:CPY #0:BEQ on
830 \change status and send to printer
840 LDA #255:EOR len:AND status:STA status:JMP printer
850 .on
860 \change status and send to printer
870 ORA status:STA status:JMP printer
880 .reset
890 \clear status and reset printer
900 LDA #0:STA status:JSR escape
910 LDA #ASC"@":JMP sub_printer
920 .false
930 \next commando. When all commands checked =>
940 \unrecognize command
950 INX:CPX #11:BNE sub_change
960 \jump to old oscli_vector
970 LDX oscli_low:LDY oscli_high:JMP (save_vec_low)
980 .sub_change
990 \change commands_low and high to next commandaddress
1000 JSR change:JMP lus1
1010 .change
1020 LDA len:SEC:ADC commands_low:STA commands_low
1030 LDA #0:ADC commands_high:STA commands_high:RTS
1040 .help
1050 \startaddress copyright to commands_low and high
1060 LDA #copyright MOD256:STA commands_low
1070 LDA #copyright DIV256:STA commands_high
1080 \clear screen
1090 LDA #12:JSR oswrch:LDX #0
1100 .lus3
1110 \number of letters from commando to len
1120 LDY #0:LDA (commands_low),Y:STA len
1130 \print linefeed and carriage return. Fix if
1140 \there must be a '*' for the printed information
1150 JSR osnewln:CPX #0:BEQ lus4:CPX #12:BEQ lus4
1160 \print a '*'
1170 LDA #ASC"*":JSR oswrch
1180 .lus4
1190 \print the information on the screen
1200 INY:LDA (commands_low),Y:JSR osasci
1210 CPY len:BNE lus4
1220 \fix if there must be [ON/OFF] after
1230 \the printed information
1240 CPX #3:BPL on_off
1250 .back
1260 \next information. RTS when finished
1270 INX:CPX #13:BEQ rts
1280 \change command_low and high to next commandaddress
1290 JSR change:JMP lus3
1300 .on_off
1310 \fix if there must be [ON/OFF] after
1320 \the printed information
1330 CPX #10:BPL back
1340 \fix the number of spaces
1350 LDA #17:SEC:SBC len:TAY:LDA #9
1360 .space
1370 \print Y-spaces
1380 JSR oswrch:DEY:BNE space
1390 LDY #0
1400 .lus5
```

```
1410 \print [ON/OFF]
1420 LDA sub,Y:JSR oswrch
1430 INY:CMP #32:BNE lus5:BEQ back
1440 .printer
1450 \printer on? send CHR$(27) to printer
1460 JSR status_printer:JSR escape
1470 \send a "!" and status to printer
1480 LDA #ASC"!":JSR sub_printer
1490 LDA status:JSR sub_printer
1500 \when len=0 => printer was off
1510 LDA len:BNE rts
1520 \switch printer off
1530 LDA #3:JMP oswrch
1540 .sub_printer
1550 \send CHR$(1) and the accumulator to printer
1560 PHA:LDA #1:JSR oswrch:PLA:JMP oswrch
1570 .escape
1580 \send CHR$(1) and CHR$(27) to printer
1590 LDA #27:JMP sub_printer
1600 .status_printer
1610 \if the printer is off => len=0, if not len<>0
1620 LDA #&75:STA len:JSR osbyte:TXA:AND #1:BNE rts
1630 \set printer on
1640 STA len:LDA #2:JMP oswrch
1650 .rts
1660 RTS
1670 .copyright
1680 EQUB 16:EQUS "(C) 6502 KENNER"+CHR$(13)
1690 .commands
1700 EQUB 4:EQUS  "PICA"
1710 EQUB 5:EQUS  "ELITE"
1720 EQUB 12:EQUS "PROPORTIONAL"
1730 EQUB 10:EQUS "COMPRESSED"
1740 EQUB 10:EQUS "EMPHASIZED"
1750 EQUB 12:EQUS "DOUBLESTRIKE"
1760 EQUB 8:EQUS  "EXPANDED"
1770 EQUB 7:EQUS  "ITALICS"
1780 EQUB 11:EQUS "UNDERLINING"
1790 EQUB 5:EQUS  "RESET"
1800 EQUB 5:EQUS  "HELP"+CHR$(13)
1810 EQUB 35:EQUS "Wildcarts (*) zijn ook"
1820 EQUS" toegestaan."+CHR$(13)
1830 .sub
1840 EQUS "ON/OFF "
1850 ]
1860 NEXT pass%
```

PAPERWARE & DISKETTE SERVICE

```
**********************************************************
*        UNIVERSAL TERMINAL V0.23 for DOS65 V0.2x        *
**********************************************************

Syntax:  TERMinal [-CDKLMP +v,w,x,y,z]
Options: -C : Print unknown control characters on screen []
         -D : Delay after each character during file trans-
              fer.  For  systems without handshaking  (e.g.
              Elektor's Junior computer)
         -K : Keep  local  copy of  characters  typed  from
              keyboard
         -L : Transmit line feed with CR
         -M : Add line feed to a CR received
         -P : Do not send LF to printer after CR
 +v,w,x,y,z : Communication  parameters (defaults to origi-
              nal settings)

v=transmit baud : 1-External  2-50  3-75  4-110  5-134
                  6-150  7-300  8-600  9-1200  10-1800
                  11-2400  12-3600  13-4800  14-7200
                  15-9600  16-19200
w=word length   : 1-8 bits  2-7 bits  3-6 bits  4-5 bits
x=parity        : 1-None  2-Odd  3-Even  4-Mark  5-Space
y=stop bits     : 1-1 bit  2-1 1.5 or 2 bits
                  (depends on w and x)
z=receive baud  : 0-same as transmitter (default)
                  1-external
```

The program allows a DOS65 version 2 computer to act as a terminal to another machine. It is most conveniently used by calling from a command file e.g.

see JUNIOR

```
; Junior terminal
; 1800 baud
TERMINAL -KDC +10,2,5,1
```

Either all or none of the parameters v,w,x,y,z must be given. If they are not given the values stored at $E734/5 are used with the interrupts turned on automatically. On leaving Yerminal the communication parameters on the host may pass commands to DOS65.
Terminal allows all the characters sent to the screen to be sent to a printer and a disc file. Only certain control codes can be sent to the printer but everything goes to the file. Input may coma from ASCII and binary files instead of the keyboard. Binary files are transmitted in Junior PM format (A9.80.A2.) with or without address information.
The program uses the non-standard routines TONSC and TOFFSC from I/O 65. If they are not at the expected address the program will produce an error message.

UNIVERSAL TERMINAL was made by: Andrew Gregory, England.

The following is available for DOS65:

-DOS65 40/80 trs, SS or DS diskette, only object code:
Send formatted diskette with label and R/W prot. to the editorial office.
Europe : Hfl. 72,00 — Outside Europe : Hfl. 87,00
Members: Hfl. 22,00 — Members: Hfl. 37,00
If paying with Eurocheque or on postgiro 841433 of W.L. van Pelt at Krimpen a.d. IJssel, subtract Hfl. 9,50.

-DOS65 40/80 trs, SS or DS diskette, with all sources:
Send formatted diskette with label and R/W prot. to the editorial office.
Europe : Hfl. 84,50 — Outside Europe : Hfl.101,50
Members: Hfl. 34,50 — Members: Hfl. 51,50
If paying with Eurocheque or on postgiro 841433 of W.L. van Pelt at Krimpen a.d. IJssel, subtract Hfl. 9,50.

The following is available for other users:

-Source Listing of the UNIVERSAL TERMINAL V0.23 for DOS65.
Europe : Hfl. 72,00 — Outside Europe : Hfl. 87,00
Members: Hfl. 22,00 — Members: Hfl. 37,00
If paying with Eurocheque or on postgiro 841433 of W.L. van Pelt at Krimpen a.d. IJssel, subtract Hfl. 9,50.

All prices including packages and postages etc. We accept no responsibility for damages etc. during transports.

****
DATACOMMUNICATION WITH 6502 COMPUTERS B. de Bruine 15-6-87
****

1. **Introduction**
The only things you need for datacommunication is a modem, a telephone connection and a computer with the right communication software. This article is a very brief introduction in datacommunication.

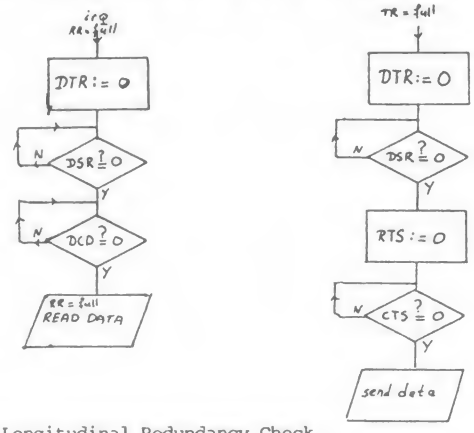
2. **Modems**
The development of high speed modems goes very fast. When scientists a few years ago pretend that the maximum available baudrate, usable on ordinary telephone lines is limited to 1200 Baud, nowadays we know, even 9600 Bd is possible! Modulating with several modulation methods at the same time increases the transfer speed. E.g. only AM correspond with 600 Bd, AM & FSK results in 2x600=1200 Bd. Adding PSK increases the speed to 2x1200=2400 Bd. With special encoding and encryption algorithms it is even possible to reach a transferrate of 9600 Bd. Unfortunately there is not yet one uniform standard for 9600 Bd modems. Another technique to spend time is file-compression, like ARC(hive) tools. The speed of the modem is not increased, but the number of data is decreased by this method. Modems can be divided in two categories: Hayes (compatible) or not (transparant modems). The Hayes 'AT' commandset is international standardizised. With those commands it is possible to set the bautrate, to autodial, program the wordformat, etc. etc. Transparant modems are dumb modems. All settings must be done manual.

3. **Databanks and bulletin boards**
What offer databanks (like the fido's) to the inlogger? The Dutch databanks contains a lot of software for popular computers like IBM-PC, Atari-ST, C-64, etc. Unfortunately there is no software available for DOS-65 computers. The only reason to log in is to download machine independent high level programmes and communication with other users of the databank.

4. **Communication protocols**
To let a computer 'talk' to another computer, a protocol is needed, to avoid misunderstanding. Very popular and many used protocols are:
-Ascii : (wait/stop, ^s/^q). Only for textfiles.
-Xmodem: Transfer of all kind of files (read article Xmodem J. Banser soon published)
-Kermit: idem.
-Videotex: Transfer pages with text and graphics (read DE 6502 KENNER nr. 47/48)

5. **Errordetection and correction**
There are several ways to recognize an error in received data. All of them add redundant information to the data. Errorcorrection is realised by asking the transmitter to transmit the data again. None of the mentioned methods are 100% full-proof (some duplicate errors cancel each other). CRC is better than LRC (statistical 99% error-free!), and LRC is better than VRC.

5.1 **Vertical Redundancy Check (VRC or paritycheck)**
To every character one bit is added, the so called paritybit. This bit is used to make the number of '1's in the character even (even parity) or odd (odd parity). The paritybit is often called the redundant-bit, because it contain extra information, only used for errorchecking.



5.2 **Longitudinal Redundancy Check (LRC or horirontal parity check)**
Not every particular character is checked for errors, but a whole datablock is checked. At the end of the block an extra checkbyte is added. This Block Check Character (BCC) consists of horizontal parity bits. Both the sender and receiver calculate the BCC. If the BCC is equal on both sides, the receiver draw the conclusion that the data is received correct.

5.3 **Cyclic Redundancy Check (CRC)**
According to a polynome a CRC-generator generates a CRC-character. The CRC-character is send as a BCC after the datablock. The receiver calculates an own checkcharacter. With help of mathematics the receiver can detect if the received datablock is error-free (remainder of division CRC(Tx)/CRC(Rx)=constant). For advanced errorchecking CRC(16) is very popular. In the hobbyworld mostly CRC(8) is used. CRC(8)=LRC ==> G(x)=x**8+1.

5.4 **Examples**
```
VRC:              LRC:                  BCC = Block Check Char.
1010 1010 even    char 1: 1010 1010     FCS = Frame Check
0011 0101 even    char 2: 0101 0101           Sequence
1010 1011 odd     char 3: 1111 0000     BCC = FCS
                  even LCR: 0000 1111   FCS is the official
                                              CCITT name.
```

6. **Elementary routines of a communication program**
Every communication program has a routine to read/write a character from/to the serial port. The following brief description of these routines for a 6502 processor and an 6551 ACIA, are derived from the DOS65 Astrid communication program.

6.1 **Interrupt routine (ACIINT)**
An interrupt routine has a higher priority than an ordinary routine. This means every time an ACIA-IRQ occurs, the interruptroutine ACIint places a received character in the receiverbuffer, or a character of the transmitter-queue is transmitted. The advantage of this method is, that no characters get lost, because the masterprogram is interrupted every time the ACIA need attention. The flowcharts shows how to read/write a character.

LIST 1 presents the interruptroutine sourcecode.

```
18AB 60       ACIINT   RTS
                       ;Aciint
                       ;Receive and transmit data via acia
18AC AD 31E1           LDA ACIASR
18AF 29 08             AND #%00001000   ;Transmitter full
18B1 F0 0D             BEQ TRANSMT
18B3 AD 30E1           LDA AREG         ;Dataregister (re-
18B6 AE 2410           LDX RECPNT       ;ceiver)
18B9 9D 0002           STA RECBUF,X
18BC EE 2410           INC RECPNT
18BF 60                RTS
18C0 AD 2510 TRANSMIT  LDA TRANPNT      ;Transmit buffer
                                        ;empty ?
18C3 F0 2C             BEQ DLYINT
18C5 AD 7610           LDA DELAY        ;Conversion delay?
18C8 D0 05             BNE 1.F
18CA AD 7710           LDA CDELAY       ;Wait until conver-
                                        ;sion time elapsed
18CD D0 22             BNE DLYINT
18CF AD 0003 1         LDA TRANBUF
18D2 48                PHA              ;Save first on stack
18D3 78                SEI
18D4 A2 01             LDX #1
18D6 EC 2510           CPX TRANPNT
18D9 F0 09             BEQ 99.F
18DB BD 0003 TRANMOV   LDA TRANBUF,X    ;Move
18DE 9D FF02           STA TRANBUF-1,X
18E1 E8                INX
18E2 D0 F7             BNE TRANMOV
18E4 CE 2510 99        DEC TRANPNT      ;Tranbuf:=tranbuf-1
18E7 68                PLA
18E8 58                CLI
18E9 8D 30E1           STA AREG         ;And send byte to
                                        ;modem
18EC 60       DLYINT   RTS (DOS65 system)
or
18EC 40                RTI (other system)
```

6.2 **Transmit a character (EN2)**
Since the interruptroutine does the most work, the transmitroutine (EN2) only has to place the character in the transmitbuffer and update the pointer. See List 2.

LIST 2

```
                       ;wait until free space in buffer (MAXTRAN)
                       ;Entry: a=char to be transmitted
                       ;Exit:  a,y unchanged, x destroyed
1838 AE 4C10 EN2       LDX BREAK        ;Breakkey pressed?
183B F0 0D             BEQ 5.F          ;Leave
183D AE 2510           LDX TRANPNT      ;And store in tranbuf
1840 E0 FF             CPX #MAXTRAN     ;Buffer full?
1842 F0 F4             BEQ EN2          ;Wait until free
1844 9D 0003 6         STA TRANBUF,X    ;space
1847 EE 2510           INC TRANPNT
184A 60       5        RTS
```

6.3 **Receive a character (GETMOD)**
First a check on the receiverpointer is needed. If this pointer equals to zero, no character is received. If there are any characters in the buffer, the first character is loaded in A.

LIST 3

```
184B AE 2410 GETMOD   LDX RECPNT       ;char. received?
184E F0 1A            BEQ 1.F          ;No char in buffer
1850 AD 0002          LDA RECBUF
1853 48               PHA              ;Save first input on
1854 A2 01            LDX #1           ;stack
1856 EC 2410          CPX RECPNT
1859 F0 09            BEQ 2.F
185B BD 0002 QUE      LDA RECBUF,X     ;Move queue
185E 9D FF01          STA RECBUF-1,X
1861 E8               INX
1862 D0 F7            BNE QUE
1864 CE 2410 2        DEC RECPNT       ;Recbuf:=recbuf-1
1867 68               PLA
1868 18               CLC
1869 60               RTS
186A 38       1       SEC              ;Exit with c=1 if no
186B 60               RTS              ;char. received
```

6.4 **Receive a character within a specified time interval (READBYT)**

To avoid a deadlock, some protocols like Xmodem and Kermit uses a time-out variable. The time-out time is the minimum number of seconds to wait for a databyte. If the databyte is not received within this time, a time-out flag is set, and the software decide to try again or to cancel receiving. Readbyte is entered with the time-out time in A, e.g.:

```
LDA #10
JSR READBYT
```

specifies a time-out of 10 sec.
The variable VIAVRA is on IO65 variable, which is every second decremented by one.

LIST 4

```
              ;Readbyte entry: a=time-out time
              ;          exit : c=1 time-out
              ;          break=0 = breakkey pressed
              ;          c=0 a=received char
2C21 8D 1BE7 READBYT  STA VIAVRA       ;Set time-out time
2C24 AD 4D10 READBUF  LDA CANFLG
2C27 D0 02            BNE READ
2C29 38               SEC
2C2A 60               RTS              ;Cancel exit
2C2B 20 4B18 READ     JSR GETMOD       ;fetch char from
                                       ;recbuf
2C2E B0 01            BCS EMPTY        ;no char in buf
2C30 60               RTS
2C31 20 542E EMPTY    JSR BRKTEST
2C34 90 02            BCC 9.F
2C36 38               SEC              ;Break exit
2C37 60               RTS
2C38 AD 1BE7 9        LDA VIAVRA
2C3B D0 E7            BNE READBUF
2C3D 38               SEC              ;Time-out exit
2C3E 60               RTS
```

6.5 **Set speed serial port**

To select the wanted baudrate, a table of many used baudrates is made. Entering the table with in X a parameter (1..5) the baudrate is programmed with:

```
LDA BAUDTAB,X
STA ACICR
```

The (s) means split speed, the receiver is disconnected from the internal baudrate generator (read DE 6502 KENNER 49, page 29 about an external baudrate generator).

LIST 5

```
      ;Baudtable predefined baudrates
1A66 00 BAUDTAB FCB   $00 ;Reserved
1A67 1A         FCB   $1A ;2400 baud, x=1
1A68 18         FCB   $18 ;1200 baud, x=2
1A69 16         FCB   $16 ; 300 baud, x=3
1A6A 08         FCB   $08 ;1200 baud, x=4(s)
1A6B 02         FCB   $02 ;  75 baud, x=5(s)
```

6.6 **Terminal emulating**

With the mentioned routines it is possible to let a computer act as a simple terminal.

```
TERMINAL JSR GETKEY     ;Key from keyboard?
         BCS GMOD       ;C=1 no key
         JSR EN2        ;Transmit key
GMOD     JSR GETMOD     ;Data received?
         BCS TERMINAL   ;C=1 nothing received
         JSR OUT        ;Print the character
         JMP TERMINAL   ;Stay in loop
```

Of course, it is more fun to make a more intelligent terminal, with breakkey detection, filtering of illegal characters, macro expansion, full/hali duplex option, etc., but the base is always a loop like this.

7. **DOS65 communication packet**

For DOS65 the following communication programs are available:

- Communication 65 (ASTRID)
  ==========
  specifications: -Terminal emulation
  -Up/downloading with Ascii- and Xmodem protocol
  -Macro-expansion
  -Autodial facilities
  -Support Hayes protocol, interspeeder or split-speed
  -Can be configurated for every modem and every systemclock.

- Viditel 65
  ==========
  With this program you can connect your computer to a videotex host. The EC65 viditelprogram is converted to DOS65. Read for more information the articles of Coen Boltjes about this program in DE 6502 KENNER 47/48. No hardware changes needed!
  Extra facilities are:
  -Support Hayes protocol, interspeeder and split-speed operation
  -Disk storage
  -Macro expansion
  -Autodialing
  -Autoreveal mode
  -Editcommands to select a page
  -Configurationprogram available to set parameters to everyones particular wishes.

For both programs a complete manual is written. You can order the software at the usual address. Write for more information to the editor of DE 6502 KENNER.

If you take the trouble to come to a national meeting, you're be able to make a free copy.

****
ONDERW : HOE HAAL JE MET DISKDOCTOR EEN DIRECTORY TERUG?
SYSTEEM: DOS65 AUTEUR: Bram de Bruine, Holland
****

HOW TO RECOVER A DIRECTORY WITH DISKDOCTOR?

DOS65 vernietigt soms een subdirectory. Dit is erg lastig, maar het is erg eenvoudig om de subdir terug te halen. Een korte beschrijving.

Op Track 0, sector 1 staat de systeemsector. Acres 32-3F geeft aan waar de subdirectories staan. Is acres 32-3F gevuld met nullen, dan zijn er geen subdirectories. Om een subdirectorie terug te halen, moet men gaan zoeken naar het Track/Sector-nummer van die directory. Men zoekt in feite naar de verzameling filenamen die met een DIR dirspec/ op het scherm geprint worden. Heeft men die gevonden, dan staat bij diskdoctor onder aan het scherm op welke track en welke sector men zich bevind. Deze moeten ingevuld worden in de systeemsector (hexadecimaal).
VOORBEELD: Alle directories zijn verdwenen. 32-3F zijn gevuld met nullen. Met "+" zoekt men tot het volgende verschijnt: (Hee! dat zijn de files die ik mis)
VIDITEL.MAC
ASTRID.MAC
MCONFIG.MAC
DIAL.MAC
Deze informatie bevindt zich bijvoorbeeld op Track 0, Sector 6. In de systeemsector wijzigen we nu:
32: 00 (TRack)
33: 06 (SeCtor)
en de subdirectory is weer hersteld! Was 32/33 niet gevuld met nullen, dan neemt men het eerstvolgende paar binnen 32-3F dat 00 bevat.
OEFEN EERST OP EEN DISK MET GARBAGE!

Copy destroys sometimes subdirectories. To repair the disk, look for the filenames of the subdir on Tr. 0. If you found them, write the Tr/Sc number on the locations 32-3F, e.g. subdir1 = 32/33, subdir2 = 34/35, etc, on Tr. 0, Sc 1. Enter numbers in hex. Use diskdoctor. 00 means: empty subdir. e.g. 34/35=00/00, no subdir2 exists.
FIRST TEST ON A DISK WITH GARBAGE.

```
                ************************************
                *  H-CODE CALCULATOR FOR JUNIOR  *
                ************************************
```

By: M. Nelissen, Belgium

Many autotests of micro-systems, running at the power-on, use H-codes. These checksums (H-codes) are mostly resident at the first or last locations of the firmware (e)proms. Generally they are calculated by a kind of polynome.
In this program i've used already existent subroutines in PM, TM and Disassem/Eprutl eproms of the extended JUNIOR-computer. With this program you can make a table with the H-codes of your own (e)proms.

```
0200:                HCODE  ORG    $0200
0210:
0220:                * EXISTENT SUBROUTINES *
0230:
0240:          4B 0C CHKSUM *      $0C4B   resident in TM
0250:          5F 10 LABJUN *      $105F   warm start  PM
0260:          E8 11 CRLF   *      $11E8   carr.ret/l.feed
0270:          68 12 RESIN  *      $1268   0 in databuffer
0280:          8F 12 PRBYTE *      $128F   print byte
0290:          34 13 PRCHA  *      $1334   print character
0300:          87 13 INPAR  *      $1387   input params
0310:          F2 FA PRINT  *      $FAF2
0320:          C5 FD CHCK   *      $FDC5
0330:
0340:                * EXISTENT POINTERS *
0350:
0360:          FA 00 POINTL *      $00FA
0370:          FB 00 POINTH *      $00FB
0380:          63 1A PARAL  *      $1A63
0390:          64 1A PARAH  *      $1A64
0400:          65 1A PARBL  *      $1A65
0410:          66 1A PARBH  *      $1A66
0420:          6E 1A CHKL   *      $1A6E
0430:          6F 1A CHKH   *      $1A6F
0440:          7C 1A BRKT   *      $1A7C
0450:
0460: 0200 A9 5F     INIT   LDAIM  $5F
0470: 0202 A0 10            LDYIM  $10
0480: 0204 8D 7C 1A         STA    BRKT    set breakpointr
0490: 0207 8C 7D 1A         STY    BRKT    +01
0500: 020A A9 0C     PRTXTA LDAIM  $0C
0510: 020C 20 34 13         JSR    PRCHA   clear screen
0520: 020F 20 FA 02         JSR    ASTER   25 asterisks
0530: 0212 20 E8 11         JSR    CRLF
0540: 0215 20 F2 FA         JSR    PRINT   print title
0550: 0218 2A        TXTA   =      '*
0560: 0219 2A               =      '*
0570: 021A 2A               =      '*
0580: 021B 20               =      '
0590: 021C 48               =      'H
0600: 021D 2D               =      '-
0610: 021E 43               =      'C
0620: 021F 4F               =      'O
0630: 0220 44               =      'D
0640: 0221 45               =      'E
0650: 0222 20               =      '
0660: 0223 43               =      'C
0670: 0224 41               =      'A
0680: 0225 4C               =      'L
0690: 0226 43               =      'C
0700: 0227 55               =      'U
0710: 0228 4C               =      'L
0720: 0229 41               =      'A
0730: 022A 54               =      'T
0740: 022B 4F               =      'O
0750: 022C 52               =      'R
0760: 022D 20               =      '
0770: 022E 2A               =      '*
0780: 022F 2A               =      '*
0790: 0230 2A               =      '*
0800: 0231 03               =      $03
0810: 0232 20 E8 11         JSR    CRLF
0820: 0235 20 FA 02         JSR    ASTER   25 asterisks
0830: 0238 20 E8 11         JSR    CRLF
0840: 023B 20 F2 FA         JSR    PRINT   print text B
0850: 023E 0A        TXTB   =      $0A
0860: 023F 42               =      'B
0870: 0240 52               =      'R
0880: 0241 4B               =      'K
0890: 0242 20               =      '
0900: 0243 3D               =      '=
0910: 0244 20               =      '
0920: 0245 52               =      'R
0930: 0246 45               =      'E
0940: 0247 54               =      'T
0950: 0248 55               =      'U
0960: 0249 52               =      'R
0970: 024A 4E               =      'N
0980: 024B 20               =      '
0990: 024C 54               =      'T
1000: 024D 4F               =      'O
1010: 024E 20               =      '
1020: 024F 50               =      'P
1030: 0250 4D               =      'M
1040: 0251 03               =      $03
1050: 0252 20 E8 11  NXTCAL JSR    CRLF
1060: 0255 20 F2 FA         JSR    PRINT
1070: 0258 0A               =      $0A
1080: 0259 47               =      'G
1090: 025A 49               =      'I
1100: 025B 56               =      'V
1110: 025C 45               =      'E
1120: 025D 20               =      '
1130: 025E 46               =      'F
1140: 025F 49               =      'I
1150: 0260 52               =      'R
1160: 0261 53               =      'S
1170: 0262 54               =      'T
1180: 0263 2C               =      ',
1190: 0264 4C               =      'L
1200: 0265 41               =      'A
1210: 0266 53               =      'S
1220: 0267 54               =      'T
1230: 0268 20               =      '
1240: 0269 4D               =      'M
1250: 026A 45               =      'E
1260: 026B 4D               =      'M
1270: 026C 4F               =      'O
1280: 026D 52               =      'R
1290: 026E 59               =      'Y
1300: 026F 20               =      '
1310: 0270 41               =      'A
1320: 0271 44               =      'D
1330: 0272 44               =      'D
1340: 0273 52               =      'R
1350: 0274 45               =      'E
1360: 0275 53               =      'S
1370: 0276 53               =      'S
1380: 0277 20               =      '
1390: 0278 3A               =      ':
1400: 0279 20               =      '
1410: 027A 03               =      $03
1420: 027B 20 68 12         JSR    RESIN   reset inputbufs
1430: 027E 20 87 13         JSR    INPAR   reset 2 adresse
1440: 0281 30 87            BMI    PRTXTA  repeat if not
1450: 0283 20 C5 FD         JSR    CHCK    done properly
1460: 0286 90 82            BCC    PRTXTA  repeat if last
1470: 0288 A9 00            LDAIM  $00     < 1st address
1480: 028A 8D 6E 1A         STA    CHKL    reset checksum
1490: 028D 8D 6F 1A         STA    CHKH
1500: 0290 AD 63 1A         LDA    PARAL
1510: 0293 AC 64 1A         LDY    PARAH
1520: 0296 85 FA            STAZ   POINTL  prepare work-
1530: 0298 84 FB            STYZ   POINTH  pointers
1540: 029A A0 00     CALCUL LDYIM  $00     start calcula-
1550: 029C B1 FA            LDAIY  POINTL  tion
1560: 029E 20 4B 0C         JSR    CHKSUM
1570: 02A1 E6 FA            INCZ   POINTL
1580: 02A3 D0 02            BNE    CNT
1590: 02A5 E6 FB            INCZ   POINTH
1600: 02A7 A5 FA     CNT    LDAZ   POINTL  restore PARA
1610: 02A9 8D 63 1A         STA    PARAL
1620: 02AC A5 FB            LDAZ   POINTH
1630: 02AE 8D 64 1A         STA    PARAH
1640: 02B1 20 D8 02         JSR    NXT
1650: 02B4 B0 E4            BCS    CALCUL  if not, continue
1660: 02B6 20 F2 FA         JSR    PRINT   else give result
1670: 02B9 0D        TXTC   =      $0D
1680: 02BA 0A               =      $0A
1690: 02BB 0A               =      $0A
1700: 02BC 48               =      'H
1710: 02BD 2D               =      '-
1720: 02BE 43               =      'C
1730: 02BF 4F               =      'O
1740: 02C0 44               =      'D
1750: 02C1 45               =      'E
1760: 02C2 20               =      '
1770: 02C3 3D               =      '=
1780: 02C4 20               =      '
1790: 02C5 03               =      $03
1800: 02C6 AD 6F 1A         LDA    CHKH
1810: 02C9 20 8F 12         JSR    PRBYTE
1820: 02CC AD 6E 1A         LDA    CHKL
1830: 02CF 20 8F 12         JSR    PRBYTE
1840: 02D2 20 E8 11         JSR    CRLF
1850: 02D5 4C 52 02         JMP    NXTCAL
1860: 02D8 18        NXT    CLC
1870: 02D9 AD 63 1A         LDA    PARAL
1880: 02DC 69 01            ADCIM  $01
1890: 02DE 8D 63 1A         STA    PARAL
1900: 02E1 AD 64 1A         LDA    PARAH
1910: 02E4 69 00            ADCIM  $00
1920: 02E6 8D 64 1A         STA    PARAH
1930: 02E9 B0 0C            BCS    NXTB    branch if $FFFF
1940: 02EB 38               SEC            is crossed
1950: 02EC AD 65 1A         LDA    PARBL   workpointer =
1960: 02EF E5 FA            SBCZ   POINTL
1970: 02F1 AD 66 1A         LDA    PARBH
1980: 02F4 E5 FB            SBCZ   POINTH  carry depends on
                                           PARB minus POINT
1990: 02F6 60        NXTA   RTS             or on crossing
                                           $FFFF, the memo-
2000: 02F7 18        NXTB   CLC             ry boundary
2010: 02F8 90 FC            BCC    NXTA
2020:
```

```
2030:                 * SUB TO PRINT 25 ASTERISKS *
2040:
2050: 02FA A9 2A      ASTER  LDAIM  '*
2060: 02FC A0 19             LDYIM  $19
2070: 02FE 20 34 13   CONT   JSR    PRCHA
2080: 0301 88                DEY
2090: 0302 D0 FA             BNE    CONT
2100: 0304 60                RTS
```

AVAILABLE FOR ELEKTOR'S OCTOPUS/EC65 COMPUTER
ONLY 40 TRACKS FORMAT SS, DD

WORDPROCESSOR VERSION 3.0 (DISK 1)
LOYS 3.1 XTRA's INTEGRATED
INSTALLATION PROGRAM (DISK 2)
SMALL MANUAL (PPWS)

Because OHIO-DOS is part of the system on bootable disks and is not placed in the public domain you must prove you bought it yourself, by sending a copy of the invoice to the editorial's office, before we can deliver the disketes.

Wordprocessor V3.0 is a powerfull, fast full-screen-editor, or more explicit: a full FILE editor, since it allows 'cruising' around from top to bottom of the file (or even more than one file at a time).
By means of the 'Installation program' on the other diskette, this editor can now be adapted to different dos versions and different machine-configurations. The only requirements are: OHIO-Dos, a 65xxx CPU and a 6845 (6545) CRT-controller. The Installation program allows you to adapt the control-keys to your keyboard and the printer control codes to your printer.
Specifications:
Cursor up/down/left/right/home/1 screen up/1 screen down/ to front of line/to rear of line/toggle writeover/insert /write graphic charater/delete char right/delete char left/ delete line/insert line;
Put file on disk, Load file(s) from disk, Erase filename from directory, Show directory, Select drive, Goto Dos, Status information, Reserve extra tracks, Goto monitor, Help menu, Hard copy, Columns print, Word wrap, Format, Right margin justification, Search and Replace, Goto string, Text copy / insert copy, Kill file, WP/asm, ASM/ wp conversion.

1> Directory	21> Kolorator
2> Create a new file	22> EDitor-MOnitor
3> Change a file name	23>
4> Delete a file	24> WORDPROCESSOR INSTALL
5> Create blank diskette	25>
6> Create diskette with files	26>
7> Create buffer space for files	27>
8> Dual disk drive copier	28>
9> Enter OS-65D system	29>
10> ASS114 (not installed)	30>
11> Word Processor V3.0	31>
12> Basicode Processor	32>
13> Resequencer (RSEQ)	33>
14> Merge basic files	34>
15> Change basics workspace	35>
16> Garbag Collector	36>
17> Arcustangens function	37>
18> Trace basics lines	38>
19> Return to Monitor	39>
20> Track zero r/w	40>

DIRECTORY WORDPROCESSOR V3.0 DISKETTE

V3.3/1	0-0	V3.3/2	1-1	DIR/BO	12-12
BASIC	2-5	B/5V/3	6-6	EDMO	7-9
KOLORA	10-11	V3.3/4	13-13	V3.3/5	14-14
BEXEC*	15-18	GARBAG	19-21	ASS114	22-25
SCRTCH	26-26	WP2.P	27-30	W/RQ/M	31-31
CHANGE	32-33	MERGE	34-34	BSCOD/1	35-35
BSCOD/2	36-36	COPIER	37-37	ATNENB	38-38
COM/TO	39-39				

To order the diskette send 2 diskettes with labels and R/W prots and pay the price as mentioned here:

Europe : Hfl. 87,00 — Outside Europe : Hfl. 104,50
Members: Hfl. 37,00 — Members: Hfl. 54,50

Members in Holland and Belgium paying on postgiro 841433 of W.L. van Pelt at Krimpen a.d. IJssel only pay Hfl. 27,50.
We also accept Eurocheques. Don't forget to put your number on the back!

Send your order to the editorial office.
All prices including packages and postages etc.
We accept no responsibility for damages etc. during transports.

Patch on Dr. Tietsch's Copier Program

P. Lindstrøm & L. Rasmussen, Denmark

When you try to copy a disk with no data on track zero, with the org. OHIO-copier, then the system will crash. In his rev. prg. (issue 43-44) Dr. Tietsch tried to remedy that with a check for data on track zero. Unfortunately, this check is not safe. Every once in a while it goes wrong and skip writing track zero to the copy - even when there is a data to write. Then the pointers are set on the track zero data, which goes to track 1, and the data from track 1 goes to track 2, and so on .. This will not be noticed, until you try to use the copy - or you compare the disks.

Solution 1: Remove lines:

```
6390: 4014 08          PHP       ;data on tr 0?
6630: 405E 28   ZERTRC PLP       ;was there any data on
6640: 405F 9003        BCC LAB20;tr 0?
```

Or put NOP in these four addresses. Now you cannot copy disks with empty track zeros, as in the org. Copier.

Solution 2: if you insist on copying empty track zeros, remove lines as in solution 1, and add-in lines:

```
3911: 3E37 F029        BEQ RETA ;data on tr 0?
3601: 3E01 A525        LDA ZRO5
3602: 3E03 F01B        BEQ LAB08;data on tr 0?
```

Now the system will not crash on copying empty track zeros. BUT observe, that if you send such a copy to some one, maybe he will not be able to copy your disk, unless he put something in track zero.
So the solution must be: Use solution 1, and always put data on track zero, - f.ex. Coen Boltjes' message in issue 48 page 49.

Printer problems with the Octopus

Maarten den Hertog, The Netherlands.

Mijn Octopus 65 bezit geen 'BUSY'-lijn en de communicatie tussen de printer en de computer liep dan ook hopeloos vast. Hieronder volgt een oplossing die ik overigens heb opgediept uit een oud nummer van Elektuur. Maar niet iedereen zal daar de beschikking over hebben, vandaar.

In principe zou de combinatie computer/printer meteen goed kunnen funktioneren. Het kan echter gebeuren dat de printer gek begint te doen als er data naar de printer wordt gestuurd terwijl deze nog bezig is. In dat geval kan de volgende oplossing worden gebruikt.

1. De 'printer busy'-aansluiting van de Centronics-steker wordt direkt verbonden met de 'clear to send'-aansluiting (CTS) van de seriële uitgangspoort (ACIA) van de Octopus 65.
2. De CTS-lijn krijgt een pull-down weerstand van 4k7 naar de nul. Deze lijn wordt dan "0" als de printer uitgeschakeld is. Op deze manier kan men ook zonder printer verder werken.
3. In de diverse programma's moeten de I/O-opdrachten dan wel aangepast worden. Bijvoorbeeld in het tekstverwerkingsprogramma WP2.0 moet $149B veranderd worden van 08 in 0D.

Ik heb deze oplossing naar volle tevredenheid toegepast op mijn eigen systeem OCTOPUS - ERICSSON. Ik kan mij voorstellen dat er misschien handiger oplossingen bedacht zijn, die wil ik dan ook graag weten.

Lately I bought a printer for my Octopus 65, but unfortunately it was not working. I only could print one sentence, and then a mysterious printer hang would occur. The problem is that the centronics connector of the Octopus has no 'BUSY-line', so the computer is still sending data even when the printer is not ready to accept them.
The solution is quit simpel. You connect the 'BUSY-line' from the printer directly with the 'clear to send' (CTS) of the ACIA of the computersystem. The result is that the computer will not send any data to the printer whenever the printer is not ready to accept them. After that you connect the CTS-line with a 4k7 resistor to the zero. This will then be "0" when the printer is not connected. In this way you can also work without a printer.
I can imagine someone has better ideas. Please send it to the editorial office.

```
                ************************************
                *  DATABANK PROGRAM FOR THE JUNIOR *
                ************************************
```

Author: M. Lameij, The Netherlands
Transl: Frank Bens, The Netherlands

>>> THEORY OF OPERATION <<<
This program makes it possible to fill the RAM-memory with text, like for a catalog of cassette tapes or records. The text will be stored in blocks of 1K RAM = 1 full screen. Empty character places at the end of a line will be filled automatically with spaces.
The next commands can be used :
] = Insert of a screen page. The concerning page-vector is looked up in a table. The screen-pages are numbered starting from decimal 1 and to be found in RAM starting from address $2000.
^ = Send a page to screen, which number is previously given by "]".
[= New start. This means, the command menu will appear on the screen and a new choise can be made.
* = Back to JUNIOR monitor.
@ = Search-possibility on screen with the choise jumping half or full lines. Every time this command is given, the cursor will move over the screen.
With the command :
= The cursor will step to the right. This way you can search for a certain character and correct it. The command "^" will store this correction into RAM and display the new page.
$ = Start of new data in a screen-page.

When you are inserting a line of text and you have made a typing error, it is possible to correct this error by using the key <BACKSPACE> to go backwards on this line. When you are ready with a line and hit the key <LINEFEED> automatically a <RETURN> will be given. The EOT-character $03 will automaticalle be generated at the last position of the last line of the screen. The sign can also be placed on another position of the screen when there are less lines needed, by typing <CTRL-C>. There are no secureties build in, therefore be carefull when you are using this program. The possibility exists that everything will go wrong when you hit a wrong key. Also a L.S.-unit can be connected to PB0, a short beeb will then be heard, when the computer is ready with transmitting a page to the screen.

```
0720:                   MONITOR SUBROUTINES
0730:
0740:          5F 10    LABJUN *      $105F   WARM START JUNIOR
0750:          E8 11    CRLF   *      $11E8   CARR.RET/LINEFEED
0760:          6F 12    HEXNUM *      $126F   ASCII TO HEX
0770:          AE 12    RECCHA *      $12AE   CHAR FROM KEYB.
0780:          34 13    PRCHA  *      $1334   CHAR TO SCREEN
0790:                   VIA ADDRESSES
0800:          00 18    ORB    *      $1800   DATA REGISTER
0810:          02 18    DDRB   *      $1802   DIRECTION REG.
0820:
0830:                   PIA ADDRESSES
0840:          F7 1A    TIMER  *      $1AF7
0850:          D5 1A    RDFLAG *      $1AD5
0860:
0870:                   ZERO PAGE ADDRESSES
0880:          00 00    ADDONE *      $0000   CONSTANTS
0890:          01 00    COUNTR *      $0001   CHAR.COUNTER
0900:          02 00    CHARAC *      $0002   CHAR. BUFFER
0910:          03 00    PAGCTR *      $0003   PAGE COUNTER
0920:          70 00    DELAY  *      $0070   DELAY COUNTER
0930:          F8 00    INL    *      $00F8   INPUT BUFFER
0940:
0950:                   PROGRAM ADDRESSES
0960:          60 02    WRTPTR *      $0260   WRITE POINTER
0970:          66 02    RDPTR  *      $0266   READ POINTER
0980:          8F 02    SCREND *      $028F   SCREEN-END PNTR
0990:          56 03    HALFFU *      $0356   HALF/FULL LINE
1000:
1010:                   *** PROGRAM START ***
1020:
1030: 0200              DATA   ORG    $0200
1040: 0200 A9 0C        INPUT  LDAIM  $0C
1050: 0202 20 F7 03            JSR    CLRSCR CLEAR SCREEN
1060: 0205 A0 00               LDYIM  $00
1070: 0207 20 86 03            JSR    TEXT   PRINT MENU
1080: 020A 20 C9 03            JSR    HALFLI HALF/FULL LINE ?
1090: 020D A5 03        INPUTA LDA    PAGCTR GET PAGE COUNTER
1100: 020F 8D 60 02            STA    WRTPTR
1110: 0212 20 53 02            JSR    ZEROST RESET COUNTERS
1120: 0215 4C D0 02     AGAIN  JMP    KEY    WAIT FOR A CHAR
1130: 0218 85 02        INPUTB STA    CHARAC SAVE CHARACTER
1140: 021A 20 48 02     INPUTC JSR    INCREM CHAR.COUNTER + 1
1150: 021D A5 02               LDA    CHARAC GET CHARACTER
1160: 021F 20 5C 02            JSR    WRITE  STORE IN PAGE
1170: 0222 4C 15 02            JMP    AGAIN  CONTINUE
1180:
1190: 0225 A9 0C        PRINT  LDAIM  $0C
1200: 0227 20 F7 03            JSR    CLRSCR CLEAR SCREEN
1210: 022A A5 03               LDA    PAGCTR GET PAGE COUNTER
1220: 022C 8D 66 02            STA    RDPTR
1230: 022F 20 53 02            JSR    ZEROST RESET COUNTERS
1240: 0232 20 0E 03     PRINTA JSR    INCPRI CHAR.COUNTER + 1
1250: 0235 20 62 02            JSR    READ   PRINT PAGES
1260: 0238 C9 03               CMPIM  $03    UNTIL EOT-SIGN
1270: 023A F0 06               BEQ    BELL   RING THE BELL
1280: 023C 20 34 13            JSR    PRCHA  PRINT CHARACTER
1290: 023F 4C 32 02            JMP    PRINTA CONTINUE
1300: 0242 20 05 04     BELL   JSR    SOUND  RING THE BELL
1310: 0245 4C 0D 02            JMP    INPUTA WAIT FOR COMMAND
1320:
1330: 0248 A5 01        INCREM LDA    COUNTR GET CHAR.COUNTER
1340: 024A 18                  CLC
1350: 024B 65 00               ADC    ADDONE ADD ONE
1360: 024D 85 01               STA    COUNTR STORE IT BACK
1370: 024F 20 68 02            JSR    LINEFU TEST ON FULL LINE
1380: 0252 60                  RTS
1390:
1400: 0253 A9 FF        ZEROST LDAIM  $FF
1410: 0255 85 01               STA    COUNTR FILL CHAR.COUNTER
1420: 0257 A9 01               LDAIM  $01
1430: 0259 85 00               STA    ADDONE FILL CONSTANTS
1440: 025B 60                  RTS
1450:
1460: 025C A4 01        WRITE  LDY    COUNTR
1470: 025E 99 00 1F            STAAY  $1F00  WRITE CHARACTER
1480: 0261 60                  RTS
1490:
1500: 0262 A4 01        READ   LDY    COUNTR
1510: 0264 B9 00 1F            LDAAY  $1F00  READ CHARACTER
1520: 0267 60                  RTS
1530:
1540: 0268 A5 01        LINEFU LDA    COUNTR
1550: 026A C9 FF               CMPIM  $FF    FULL LINE ?
1560: 026C D0 25               BNE    LINEB  IF NOT, NEXT LINE
1570: 026E AD 60 02            LDA    WRTPTR GET WRITE POINTER
1580: 0271 29 0F               ANDIM  $0F    MASK BITS
1590: 0273 C9 03               CMPIM  $03    IS IT A 3 ? IF SO
1600: 0275 F0 0E               BEQ    LINEA  END OF SCREEN
1610: 0277 C9 07               CMPIM  $07    IS IT A 7 ? IF SO
1620: 0279 F0 0A               BEQ    LINEA  END OF SCREEN
1630: 027B C9 0B               CMPIM  $0B    IS IT A B ? IF SO
1640: 027D F0 06               BEQ    LINEA  END OF SCREEN
1650: 027F C9 0F               CMPIM  $0F    IS IT A F ? IF SO
1660: 0281 F0 02               BEQ    LINEA  END OF SCREEN, IF
1670: 0283 D0 18               BNE    LINEC  NOT STAY ON SCREEN
1680: 0285 AD 60 02     LINEA  LDA    WRTPTR GET WRITE POINTER
1690: 0288 8D 8F 02            STA    SCREND SAVE IN SCREEN-END
1700: 028B A9 03               LDAIM  $03    SAVE EOT-SIGN
1710: 028D 8D FF 23            STA    $23FF  IN PAGE AND
1720: 0290 4C 5F 10            JMP    LABJUN RETURN TO MONITOR
1730: 0293 C9 00        LINEB  CMPIM  $00    PAGE FULL ?
1740: 0295 D0 06               BNE    LINEC  IF NOT, CONTINUE
1750: 0297 EE 60 02            INC    WRTPTR IF SO, INCREASE
1760: 029A EE 66 02            INC    RDPTR  WRITE & READ POIN-
1770: 029D 60           LINEC  RTS            TERS
1780:
1790: 029E A9 3D        FILLLI LDAIM  $3D    CALC. LINE LENGTH
1800: 02A0 38                  SEC           IN USE
1810: 02A1 E5 01               SBC    COUNTR
1820: 02A3 10 13               BPL    FILLA
1830: 02A5 A9 7D               LDAIM  $7D
1840: 02A7 38                  SEC
1850: 02A8 E5 01               SBC    COUNTR
1860: 02AA 10 0C               BPL    FILLA
1870: 02AC A9 BD               LDAIM  $BD
1880: 02AE 38                  SEC
1890: 02AF E5 01               SBC    COUNTR
1900: 02B1 10 05               BPL    FILLA
1910: 02B3 A9 FD               LDAIM  $FD
1920: 02B5 38                  SEC
1930: 02B6 E5 01               SBC    COUNTR
1940: 02B8 AA           FILLA  TAX
1950: 02B9 A9 20        FILLC  LDAIM  $20    FILL LINE
1960: 02BB 85 02               STA CHARAC    WITH SPACES
1970: 02BD E6 01               INC    COUNTR
1980: 02BF A5 02               LDA    CHARAC
1990: 02C1 20 5C 02            JSR    WRITE
2000: 02C4 A5 01               LDA    COUNTR
2010: 02C6 C9 FE               CMPIM  $FE
2020: 02C8 F0 03               BEQ    FILLB
2030: 02CA CA                  DEX
2040: 02CB 10 EC               BPL    FILLC
2050: 02CD 4C 1A 02     FILLB  JMP    INPUTC
2060:
2070: 02D0 20 AE 12     KEY    JSR    RECCHA WAIT FOR A CHAR.
2080: 02D3 C9 5B               CMPIM  '[     IS IT A [ ?
2090: 02D5 D0 03               BNE    KEYA   IF NOT, NEXT
2100: 02D7 4C 00 02            JMP    INPUT  IF SO, TO START
2110: 02DA C9 2A        KEYA   CMPIM  '*     IS IT A * ?
2120: 02DC D0 03               BNE    KEYB   IF NOT, NEXT
2130: 02DE 4C 5F 10            JMP    LABJUN IF SO, TO MONITOR
2140: 02E1 C9 5E        KEYB   CMPIM  '^     IS IT A ^ ?
2150: 02E3 D0 03               BNE    KEYC   IF NOT, NEXT
2160: 02E5 4C 25 02            JMP PRINT     IF SO, PRINT PAGES
2170: 02E8 C9 0A        KEYC   CMPIM  $0A    IS IT A LINEFEED ?
2180: 02EA D0 08               BNE    KEYD   IF NOT, NEXT
2190: 02EC A9 0D               LDAIM  $0D    IF SO, PRINT ALSO
2200: 02EE 20 34 13            JSR    PRCHA  A RETURN
2210: 02F1 4C 9E 02            JMP    FILLLI AND FILL THE LINE
2220: 02F4 C9 08        KEYD   CMPIM  $08    IS IT A BACKSPACE?
2230: 02F6 D0 05               BNE    KEYE   IF NOT,NEXT
```

```
2240: 02F8 C6 01          DEC   COUNTR IF SO, CHAR.CNTR-1
2250: 02FA 4C D0 02       JMP   KEY
2260: 02FD C9 40    KEYE  CMPIM $40    IS IT A @ ?
2270: 02FF D0 03          BNE   KEYF   IF NOT, NEXT
2280: 0301 4C 20 03       JMP   CORREC IF SO, CORRECTION
2290: 0304 C9 5D    KEYF  CMPIM ']     IS IT A ] ?
2300: 0306 D0 03          BNE   KEYG   IF NOT, NEXT
2310: 0308 4C 95 03       JMP   PAGE   IF SO, PAGENUMBER?
2320: 030B 4C 18 02 KEYG  JMP   INPUTB SAVE CHARACTER
2330:
2340: 030E A5 01    INCPRI LDA  COUNTR GET CHAR.COUNTER
2350: 0310 18              CLC
2360: 0311 65 00           ADC  ADDONE ADD ONE
2370: 0313 85 01           STA  COUNTR SAVE IT
2380: 0315 C9 00           CMPIM $00   COUNTER EMPTY ?
2390: 0317 D0 06           BNE  INCEND IF NOT, CONTINUE
2400: 0319 EE 60 02        INC  WRTPTR IF SO, WRITE PNTR+1
2410: 031C EE 66 02        INC  RDPTR  AND READ POINTER+1
2420: 031F 60       INCEND RTS
2430:
2440: 0320 A9 1C    CORREC LDAIM $1C
2450: 0322 20 F7 03        JSR  CLRSCR CURSOR HOME
2460: 0325 A5 03           LDA  PAGCTR GET PAGE COUNTER
2470: 0327 8D 60 02        STA  WRTPTR FILL WRITE POINTER
2480: 032A 8D 66 02        STA  RDPTR  AND READ POINTER
2490: 032D 20 53 02        JSR  ZEROST RESET COUNTERS
2500: 0330 20 AE 12 KEYX   JSR  RECCHA WAIT FOR A CHAR.
2510: 0333 C9 40           CMPIM $40   IS IT A @ ?
2520: 0335 F0 19           BEQ  CORRA
2530: 0337 C9 23           CMPIM '#    IS IT A # ?
2540: 0339 F0 32           BEQ  CORRB
2550: 033B C9 5E           CMPIM $^    IS IT A ^ ?
2560: 033D F0 44           BEQ  CORRC
2570: 033F C9 08           CMPIM $08   IS IT A BACKSPACE?
2580: 0341 F0 3B           BEQ  CORRD
2590: 0343 85 02           STA  CHARAC SAVE CHARACTER
2600: 0345 20 0E 03        JSR  INCPRI INCREASE COUNTER
2610: 0348 A5 02           LDA  CHARAC GET CHARACTER
2620: 034A 20 5C 02        JSR  WRITE  AND PRINT IT
2630: 034D 4C 30 03        JMP  KEYX   WAIT FOR A CHAR.
2640: 0350 A9 08    CORRA  LDAIM $08   DELETE INSERTED
2650: 0352 20 34 13        JSR  PRCHA  CHARACTER
2660: 0355 A2 3F           LDXIM $3F
2670: 0357 20 0E 03 CORRF  JSR  INCPRI PRINT HALF
2680: 035A 20 62 02        JSR  READ   OR FULL LINE
2690: 035D C9 03           CMPIM $03   SCREEN END ?
2700: 035F F0 09           BEQ  CORRE  IF SO, STOP
2710: 0361 20 34 13        JSR  PRCHA  IF NOT, PRINT
2720: 0364 CA              DEX         AS LONG AS
2730: 0365 10 F0           BPL  CORRF  LINE NOT FULL AND
2740: 0367 4C 30 03        JMP  KEYX   WAIT FOR A CHAR.
2750: 036A 4C 15 02 CORRE  JMP  AGAIN
2760: 036D 20 0E 03 CORRB  JSR  INCPRI CHAR.COUNTER + 1
2770: 0370 A9 08           LDAIM $08   DELETE INSERTED
2780: 0372 20 34 13        JSR  PRCHA  CHARACTER AND
2790: 0375 20 62 02        JSR  READ   PRINT 1 CHAR.
2800: 0378 20 34 13        JSR  PRCHA  FROM PAGE
2810: 037B 4C 30 03        JMP  KEYX   WAIT FOR A CHAR.
2820: 037E C6 01    CORRD  DEC  COUNTR CHAR.COUNTER - 1
2830: 0380 4C 30 03        JMP  KEYX   WAIT FOR A CHAR.
2840: 0383 4C 25 02 CORRC  JMP  PRINT  PRINT PAGES
2850:
2860: 0386 B9 23 04 TEXT   LDAAY MESSAG GET TEXT
2870: 0389 C9 03           CMPIM $03   EOT-SIGN ?
2880: 038B F0 07           BEQ  TEXEND IF SO, STOP
2890: 038D 20 34 13        JSR  PRCHA  IF NOT, PRINT
2900: 0390 C8              INY
2910: 0391 4C 86 03        JMP  TEXT   NEXT CHARACTER
2920: 0394 60       TEXEND RTS
2930:
2940: 0395 A9 00    PAGE   LDAIM $00
2950: 0397 85 FB           STA  INL    CLEAR INPUT BUFFER
2960: 0399 A9 08           LDAIM $08   DELETE INSERTED
2970: 039B 20 34 13        JSR  PRCHA  CHARACTER
2980: 039E A0 B6    PAGEA  LDYIM $B6   PRINT
2990: 03A0 20 B6 03        JSR  TEXT   TEXT STRING
3000: 03A3 20 AE 12 PAGEB  JSR  RECCHA WAIT FOR A CHAR.
3010: 03A6 C9 0D           CMPIM $0D   IS IT A RETURN ?
3020: 03A8 F0 0B           BEQ  PAGEC  IF SO, PRINT PAGE
3030: 03AA C9 24           CMPIM '$    IS IT A $ ?
3040: 03AC F0 0D           BEQ  PAGED  IF SO, BACK INPUT
3050: 03AE 20 6F 12        JSR  HEXNUM TRANSFER NUMERIC
3060: 03B1 D0 EB           BNE  PAGEA  ERROR, TRY AGAIN
3070: 03B3 F0 EE           BEQ  PAGEB  NEXT CHARACTER
3080: 03B5 20 C1 03 PAGEC  JSR  VECTOR GET PAGE VECTOR
3090: 03B8 4C 25 02        JMP  PRINT  AND PRINT
3100: 03BB 20 C1 03 PAGED  JSR  VECTOR GET PAGE VECTOR
3110: 03BE 4C 0D 02        JMP  INPUTA WAIT FOR A CHAR.
3120:
3130: 03C1 A4 F8    VECTOR LDY  INL    GET BUFFER
3140: 03C3 B9 EA 04        LDAAY VECTAB FETCH PAGE VECTOR
3150: 03C6 85 03           STA  PAGCTR AND SAVE IT
3160: 03C8 60              RTS
3170:
3180: 03C9 20 E8 11 HALFLI JSR  CRLF   START ON NEW LINE
3190: 03CC A0 BF           LDYIM $BF   PRINT
3200: 03CE 20 86 03        JSR  TEXT   TEXT STRING
3210: 03D1 20 AE 12        JSR  RECCHA WAIT FOR A CHAR.
3220: 03D4 C9 4A           CMPIM 'J    IS IT A J ?
3230: 03D6 F0 06           BEQ  HALFA  IF SO, CONTINUE
3240: 03D8 C9 4E           CMPIM 'N    IS IT A N ?
3250: 03DA F0 0A           BEQ  HALFB  IF SO, CONTINUE
3260: 03DC D0 EB           BNE  HALFLI IF NOT, TRY AGAIN
3270: 03DE A9 1F    HALFA  LDAIM $1F
3280: 03E0 8D 56 03        STA  HALFFU SET FOR HALF LINE
3290: 03E3 4C EB 03        JMP  HALFC
3300: 03E6 A9 3F    HALFB  LDAIM $3F
3310: 03E8 8D 56 03        STA  HALFFU SET FOR FULL LINE
3320: 03EB 20 E8 11 HALFC  JSR  CRLF   START ON NEW LINE
3330: 03EE A0 9E           LDYIM $9E   PRINT
3340: 03F0 20 86 03        JSR  TEXT   TEXT STRING
3350: 03F3 20 E8 11        JSR  CRLF   NEW LINE
3360: 03F6 60              RTS
3370:
3380: 03F7 20 34 13 CLRSCR JSR  PRCHA  CLEAR
3390: 03FA A9 80           LDAIM $80
3400: 03FC 8D F7 1A        STA  TIMER  DELAY
3410: 03FF 2C D5 1A CLRA   BIT  RDFLAG
3420: 0402 10 FB           BPL  CLRA
3430: 0404 60              RTS
3440:
3450: 0405 A9 01    SOUND  LDAIM $01
3460: 0407 8D 00 18        STA  ORB    SET DATA REGISTER
3470: 040A 8D 02 18        STA  DDRB   SET DIR. REGISTER
3480: 040D A9 7F           LDAIM $7F   SET DELAY
3490: 040F 85 70           STA  DELAY
3500: 0411 EE 00 18 SOUNA  INC  ORB    SWITCH DATA
3510: 0414 A6 70           LDX  DELAY  REGISTER ON
3520: 0416 E8       SOUNB  INX         AND OFF
3530: 0417 D0 FD           BNE  SOUNB
3540: 0419 C6 70           DEC  DELAY  WAIT
3550: 041B C6 70           DEC  DELAY
3560: 041D 30 03           BMI  SOUNC
3570: 041F 4C 11 04        JMP  SOUNA
3580: 0422 60       SOUNC  RTS
3590:
3600:
3610: 0423          MESSAG ORG  $0423
3620: 04EA          VECTAB ORG  $04EA
```

*** TEXT STRINGS ***

```
01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

41 41 54 41 42 41 4E 4B 0A 0D 2D 2D 2D 2D 2D DATABANK ----
2D 2D 2D 0A 0D 56 41 4C 49 44 20 43 4F 4D 4D --- VALID COMM
41 4E 44 53 3A 0A 0D 5E 20 3D 20 50 52 49 4E ANDS:  ^ = PRIN
54 20 50 41 47 45 0A 0D 5B 20 3D 20 4E 45 57 T PAGE  [ = NEW
20 53 54 41 52 54 0A 0D 2A 20 3D 20 4D 4F 4E  START  * = MON
49 54 4F 52 0A 0D 5D 20 3D 20 50 41 47 45 20 ITOR  ] = PAGE
4E 55 4D 42 45 52 0A 0D 40 20 3D 20 53 45 41 NUMBER  @ = SEA
52 43 48 20 4C 49 4E 45 0A 0D 23 20 3D 20 43 RCH LINE  # = C
55 52 53 4F 52 2D 2D 3E 0A 0D 24 20 3D 20 4E URSOR-->  $ = N
45 57 20 44 41 54 41 0A 0D 03 53 54 41 52 54 EW DATA   START
20 57 49 54 48 20 50 41 47 45 20 4E 55 4D 42  WITH PAGE NUMB
45 52 03 20 50 41 47 45 3F 03 48 41 4C 46 20 ER  PAGE? HALF
4C 49 4E 45 20 53 45 41 52 43 48 20 2B 4A 2F LINE SEARCH (J/
4E 29 20 03 1F 1F 23 27 2B 2F 33 37 3B 3F 3F N)
3F 3F 3F 3F 3F 43 47 4B 4F 53 57 5B 5F 63 67
67 67 67 67 67 67 6B 6F
```

IF YOU WISH YOU CAN EXTEND THIS TABLE

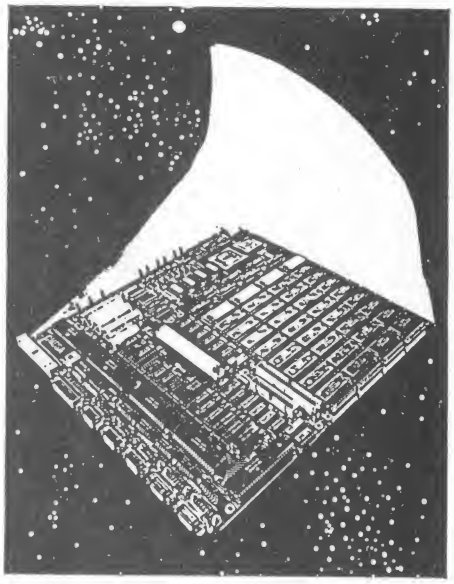
DISKETTES 80/40 TRS, SS,DD FOR ELEKTOR'S EC65/OCTOPUS
Because OHIO-DOS is part of the system on bootable disks and is not placed in the public domain you must prove you bought it yourself, by sending copy of the invoice, before we can deliver the diskettes. To order, mention the format and pay on postgiro 841433 of W.L. van Pelt, Krimpen aan den IJssel or with Eurocheque. In other cases bankcheque.

Bootable Malach disk with menu-driven **BASICODE**-routines.
Send empty diskette with label and R/W-prot.
Europe : Hfl. 72,00 Outside Europe : Hfl. 89,00
Members: Hfl. 22,00 Members: Hfl. 39,00
Members in Holland and Belgium paying on postgiro 841433 only pay Hfl. 12,50. We also accept Eurocheques. Don't forget to put your number on the back of it.

OCTOPUS-FORTH 1.2 (ONLY 80 TRS) specially build for Elektor's Octopus/EC65 6502-computer as published in Elektor Germany and Elektuur Holland. It uses the OHIO-DOS which functions as a host for the FORTH-system. OCTOPUS-FORTH 1.2 is based on the model of the FORTH INTEREST GROUP as published in their Fig-Forth 6502 Assembly Source Listing (both of them can be ordered by our club). Several bugs in this model are removed and a lot of high level words are rewritten in code to increase speed.
Send two empty diskettes with label and R/W prots.
Europe : Hfl. 109,50 Outside Europe : Hfl. 126,50
Members: Hfl. 59,50 Members: Hfl. 76,50
Members in Holland and Belgium paying on postgiro 841433 only pay Hfl. 50,00. We also accept Eurocheques. Don't forget to put your number on the back of it.

****
* OMEGA: THE DESKTOP MAINFRAME *
****

De redaktie was geinteresseerd in enige informatie over een machine welke al enige malen was opgevallen in de literatuur over nieuwe hardware op de markt. Zij vroeg aan en kreeg van Snijders Micro Systems te Vlierden informatie welke wij hier voor u samenvatten.



De Omega is een krachtig 32 bit werkstation gebaseerd op de 68020 CPU terzijde gestaan door een 68881 coprocessor. De toepassingsmogelijkheden beslaan een gebied vanaf software ontwikkelingssysteem en getallenkraker voor wetenschappelijke toepassingen tot procescomputer, data-acquisitiesysteem of besturingscomputer in de single board uitvoering. Een interessante machine voor zowel industrie als universiteiten en HTS'en. Dus ook voor onze club, al vermoeden wij dat de prijs niet uit ieders buidel kan worden getoverd.
De Omega is een moderne microcomputer opgebouwd rond de 68020 CPU van Motorola met een volledige 32 bits struktuur. Ontwikkeld als single board computer met alle benodigde interfaces op een print is het achtergrondgeheugen het enige externe onderdeel van een professioneel 32 bit werkstation. Tot de standaarduitrusting behoort onder meer een 68881 drijvende komma rekenprocessor. De systeemfrekwentie bedraagt 12,5 Mhz, terwijl hogere frekwenties (16,67 ,20 of 25 Mhz) tegen meerprijs mogelijk zijn. Het geheugen bestaat uit 128/256K byte rom en 1 Megabyte no wait-state statisch, niet vluchtig Cmos Ram. Zelfs in de 25 Mhz uitvoering worden alle lees- en schrijfopdrachten binnen een cyclus uitgevoerd. Een 25,5 Mbyte harde schijf en een 1,2 Mbyte diskette station worden gebruikt als achtergrondgeheugen. De SCSI initiator, die de communicatie met de harde schijf verzorgd, kan maximaal zeven units besturen, bv een tweede harde schijf of een tapestreamer. Verder is het systeem uitgerust met vier RS232 interfaces, een real time clock/calender met battery backup, een netwerkinterface en een I/O expansion bus (16 Mbyte adresseringsruimte).
Als besturingssysteem is gekozen voor OS9/68K van Microware Systems Corporation. OS9/68K heeft een UNIX-achtige struktuur op user nivo (ons eigen DOS65 systeem ging in die gedachte al voor, weet u nog?), is multi-user en multi-tasking en ondersteunt standaard 4 gebruikers (maximaal 12) en een netwerkconfiguratie. OS9/68K biedt een aantal mogelijkheden die in de industrie onontbeerlijk zijn: het is 'real time', kompakt en efficient geschreven en volledig 'rommable', dat wil zeggen het kan in Eprom gezet worden en draaien zonder ondersteuning van hard- of floppy disk, dus zonder mechanische delen.
De opsteekkaarten die op dit moment voorhanden zijn bestaan uit een 8 kanaals RS232 kaart, 4 Megabyte statische Cmos Ram met battery backup, een hoge resolutie grafische kleurenkaart (640x480 punten, 16 kleuren uit een pallet van 4096), een 'prototyping' kaart (ruimte gereserveerd voor ontwikkeling van eigen I/O, etc) en een adapter kaart voor G64...STE...IBM PC... bus, die toegang geeft tot een uitgebreide serie I/O kaarten. In dit geval valt te denken aan AD/DA omzetters, instrumentatie-versterkers ten behoeve van rekstrookjes en PT-100 elementen, servo- of stappenmotor besturingen etc.
Mede door het gebruik van het veelzijdige OS9/68K besturingssysteem lopen de toepassingsmogelijkheden uiteen van een eenvoudige datalogger of besturingscomputer met software in Eprom via een single-user werkstation tot een krachtig mainframe-achtig netwerk met meer dan honderd stations en zonodig nog meer gebruikers. Het hoge prestatienivo, vergelijkbaar met een minicomputer (VAX 11/780) en een uitermate gunstige prijs/prestatieverhouding maakt de Omega tot een alternatief voor zowel een PC (prijs) als een minicomputer (prestaties). De hoge verwerkingssnelheid is met name belangrijk op het wetenschappelijke vlak. De Omega kan ingezet worden als pre-processor bij meetopstellingen of voor digitale signaalverwerking, zoals Fast Fourier Transformatie (FFT) en beeldverwerking. Een niet-vluchtig geheugen van 5 Megabyte en de netwerkfaciliteiten bieden ruime mogelijkheden voor inzet in een industriele omgeving waar het gebruik van mechanische delen (disk drives) uit den boze is en waar toch grote hoeveelheden gegevens verzameld worden. Dit laatste komt veelvuldig voor in bv de procesindustrie.
De Omega is ook leverbaar als SBC voor OEM gebruikers. De statische ram en ingebouwde filters staan garant voor een hoge mate van storingsongevoeligheid in een industriele omgeving. Door het gebruik van spanningsregelaars op de print kan met een ongestabiliseerde voeding volstaan worden bij een zeer lage vermogensopname van 8 Watt.

TIP van Ernst Elderenbosch, Holland

Mijn DOS65 systeem draait op een geschakelde voeding die bij de firma 'Goris Elektronika' (Meek-it) vandaan komt. Deze is maar iets groter dan een eurokaart en levert 5 Volt bij 10 Ampere en 12 Volt bij 2 Ampere en nog een klein beetje -12 Volt. Ruim voldoende en lekker efficient. Geen straalkacheltje zoals de voeding in de eerdere Junior.

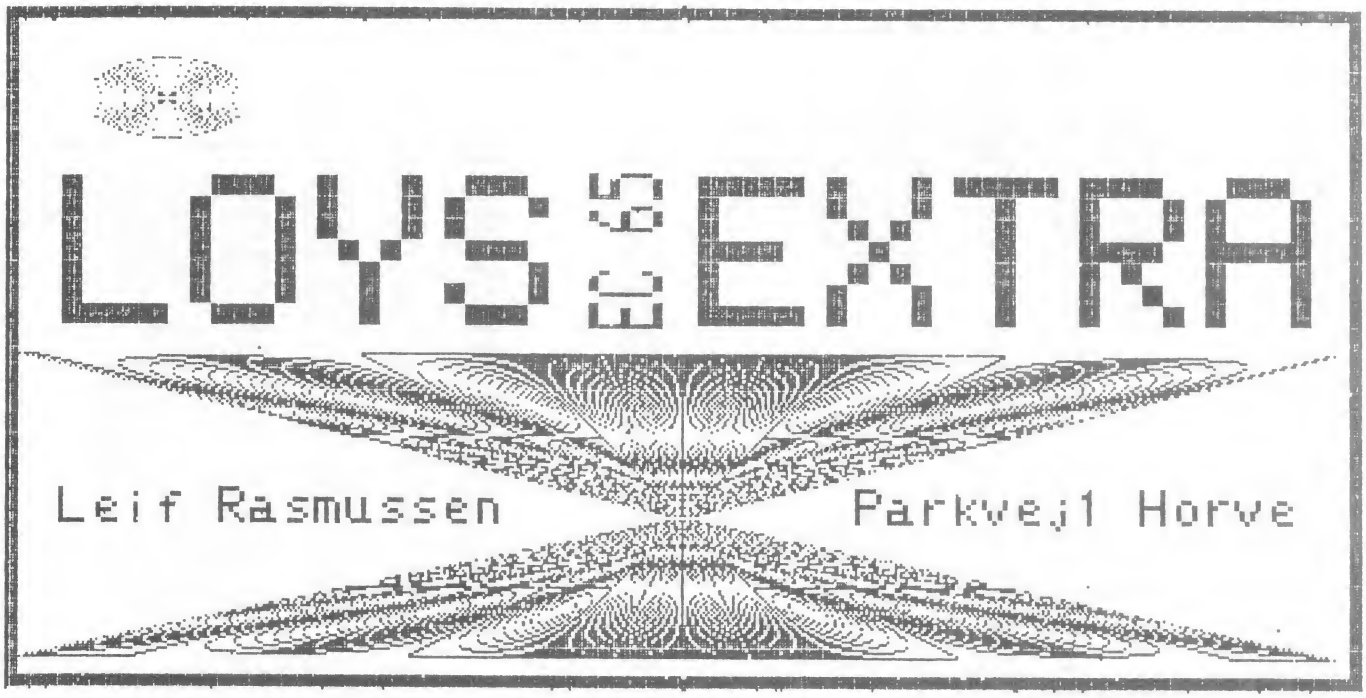
****
* A L(LIST) NNNN,<CR> IMPLEMENTATION IN MICRO ADE *
****

By: Fernando Lopes, Portugal

The good old Micro-ADE, which i've made working with bank-switching (red.: ask the editorial office for the price of the paperware), lacks a common and usefull feature of the LIST command. The sort of command necessary to list the lines following a given line-number NNNN, no matter how many they are, because we can BREAK the listing at any moment, or we're using the P(AGE) mode feature (ON). I remember I used to type L NNNN,9999<CR> to command that.
The cure: it's just as easy as changing two byte of code. If in the Junior's Micro-ADE, they are $236B and $236D, that must contain $1E and $1B respectively. Else, if using Marc Lachaert's new version (V2.0), they are $05B2 and $05B4.
The inner workings: the original only checks if the 1st PARAMeter (LOPAR/HIPAR) is null, i.e., L<CR>. Of course, in that case, 2nd PARAMeter is also null. So, we can check only if the latter (LOPAR+01/HIPAR+01) is null; and then 2 cases are acknowledged: L<CR>, as before, and L NNNN,<CR> our new command! In all cases, as was in the original, the 2nd PARAM is raised to maximum 9999, (FFFF in my program) to obtain a listing of all lines following 0000 or NNNN.

APPLE'S NIEUWE SOFTWARE BEDRIJF 'CLARIS'

De door Apple Computer recentelijk in het leven geroepen software-dochtermaatschappij heeft aangekondigd dat zij software op de markt zal brengen onder de onafhankelijke bedrijfsnaam Claris Corporation.
Apple heeft deze nieuwe onderneming in het leven geroepen voor de marketing van toepassings-software voor de Apple Macintosh en de Apple][personal computers, te beginnen met de pakketten die Apple het meest recent heeft uitgebracht. De bestaande produkten zijn MacWrite, MacDraw, MacProject, MacPaint, AppleWorks en Acces][.
In de nabije toekomst zal de nieuwe onderneming zich volgens president-directeur William C. Campbell concentreren op werkzaamheden die los staan van Apple en op de marketing van bestaande en toekomstige produkten onder eigen naam. Hij zei verder dat Claris zo spoedig mogelijk de overgang wil maken van een Apple dochtermaatschappij naar een onafhankelijk bedrijf dat een complete lijn toepassingen ontwikkelt en ondersteunt. Het ligt in de bedoeling dat Apple een minderheidsaandeel behoudt in het nieuwe bedrijf.
"We hebben voor de naam Claris gekozen omdat deze duidelijkheid ('clarity') en helderheid weerspiegelt. Het herinnert ons eraan dat het vormgeven van de toekomst een heldere visie vereist", aldus Campbell, voorheen Apple's executive vice president voor sales en marketing in de VS.



The object of this paper is to present a proposal on how to bind some of the many utilities of EC 65's systemdisk "LOYS 3.1" together in a comfortable way, and add some extra's.
The following features will be loaded with bootup:

1> ERase a filename
2> RE Assmbl. (always from dr.A)
3> RE Basic --- " ---
4> RE Word p. --- " ---
5> RE Edmo --- " ---
6> RE Kolorator --- " ---
7> RE Resequenser - " ---
8> RE I re-enable edit
9> RE Trace on/off
10> Auto-line numbering on/off
11> Extra short-hand strings
12> Error-text print-out
13> Printer-initialising menu

ad 1: Firstly it's annoying not to be able to erase a filename from directory without loading Bexec* and run Delete a filename! So this feature is now back in Dos 3.3 (in exchange for eXQute which is rarely used. Ps those who wants both, see later).
ad 2-4: Secondly, reloading of another transient processor should always start with: select drive A, as it is now the computer breaks down, trying to load as or wp from drive D!
ad 5: The amazing EDitor/MOnitor by Fred Aubert is right at hand with : DISK!"RE E".
ad 6: The Kolorator software by P. Lavigne can be installed in the system like in this proposal with: DISK!"RE K".
ad 7-8: When you are typing in a Basic program, it happens that you want to change linenumbers. You can do this now just by DISK!"RE R", then resequenser (or !) is enabled, and if you want edIt-command back, you type DISK!"RE I" (or use the much more comfortable full screen editor instead).
ad 9: With DISK!"RE T" you switch on and off the trace of Basic linenumbers.
ad 10: When typing in a Basic program it is sometimes comfortable to have the linenumbers printed automatically by the computer, so this feature is now proposed being toggled on and off with: '@' (commercial at). Then you are asked to give start line nr. and increments.
ad 11: The undispensable Short-hand has some minor defects, f. ex. with RND you have to type in: (1) afterwards. By adding a small detour in the middle of the short hand routine, you can make your own "custom made" short hand strings, f. ex. when experimenting with Kolorator in direct mode, you must type: print#2,chr$(18)" for every command line. This string now comes out just by typing ESC:.
ad 12: It is difficult to remember the 16 different error codes, so now they are printed out in human text as proposed by Gert Klein in DE 6502 KENNER nr. 39.
ad 13: It is comfortable to have a selection of printer modes at hand. This is described in DE 6502 KENNER nr. 44 (NB! there is a bug there at the end: carriage return must come a f t e r reset).

I N S T A L L A T I O N :
All these features together with Full screen editor and print&(x,y) is stored on one track and loaded in address $D800 - $DFFF.
So here is how to do it (on a copy):
-- First you must clear one track on side A (f. ex. DIR or RSEQ).
-- Put the assembled routines in their appropriate addresses and save the 8 pages on this track.
-- Now change the boot routine on track zero (see DE 6502 KENNER nr. 45), so that this new track (sector 1) is loaded to $D800 instead of track 12 sector 5.
-- In dos command table you change:
Address $2E6D ff: E R 02 D8 to point to your new erase routine.
Address $2E6B f: AF D8 to point to your new re-load routine.
(Ps. the track numbers for your EDMO, Kolorator and Resequenser routines could differ from those used here).
(Pps. the edmo you get from disk 18, Kolorator from disk 15 and rseq you get by save the machine code evolving when running the RSEQ from EC 2. (NB: *SA 35,1=BB00/5)).
-- In dos error routine you write in address $2ACE ff:

```
20 40 DC    JSR ERROR-PRINTOUT
20 73 2D    JSR STROUT
20 45 52
52 4F 52
00          "ERROR"
```

to get the new text printed.
(Ps. CAll track 01 to f. ex. $6A00 and make the changes, do not make them 'in situ' - you will loose the RUN" BEXEC*" command).
-- In Full screen editor you write in address $DD0B f: 20 47 DF and in address $DF47 f: 20 70 DA to get your new printer menu and auto line in the 'question round'.
-- Now you save your fully equiped track with *SA XX,1=D800/8.
-- At last (sic!) there is one change in Short hand (track 06,4); you write in address $E678 ff: 20 A0 DB to point to your extra short hands (save it with *SA 06,4=E400/4).

It seemes complicated, but it is worth-while, and the extra routines are not dependend on each other, so you can make one step at a time, and try them out one by one.

For those who wants the XQ command as well as the ER, there is room left to make a small routine that switches between xq and er, f.ex. RE X.

One minor problem arises with "MERGE" by A. Nachtmann, but it is easily relocated to lower address, since it is mostly text (it would be nice to have merge facility right at hand too).

```
LOYS 3.1 EXTRA'S -ERASE-

              !!! CHANGE $2E6C IN DOS CMD TBL !!!
              !!! TO: ER 02 D8, (POINT HERE)  !!!

D800                    ORG   $D800
                        TTL   LOYS 3.1 EXTRA'S -ERASE-
                  ++ D E F I N I T I O N S ++
00E1            OSIBAD  EQU   $00E1   POINT TO CMD BUFFER
                ($2E1E IN DOS, $D800 IN BASIC)
2CE5            BUFINC  EQU   $2CE5   INDEX TO CMD BUFFER
E5C5            RDDIR   EQU   $E5C5   READ DIR. FROM DISK
0010            PTR     EQU   $0010   POINT TO DIR.BUFFER
2D73            STROUT  EQU   $2D73   PRINT STRING
2761            UNLDHD  EQU   $2761   UNLOAD HEAD
E5AE            WRDIR   EQU   $E5AE   WRITE DIR.
                --------------------------------
D800 FF         TEMPA   HEX   FF
D801 FF         TEMPC   HEX   FF
D802 FF         TEMPD   HEX   FF
D803 A2 01              LDXIM $01     :: GET DIR ::
D805 20 C5 E5           JSR   RDDIR   READ DIR TO $2E79
D808 A2 00              LDXIM $00     :: GET CMD-FN ::
D80A AC E5 2C           LDY   BUFIND  POINT TO CMD-START
D80D B1 E1      CMDBEG  LDAIY OSIBAD  GET CHR IN CMD
D80F C9 0E              CMPIM $0E     ?END OF CMD
D811 90 06              BCC   CMDEND
D813 E8                 INX
D814 C8                 INY
D815 E0 06              CPXIM $06     ? 6 CHR.S
D817 90 F4              BCC   CMDBEG  IF NO, GET NEXT
D819 CA         CMDEND  DEX           ::SAVE LENGTH OF FN::
D81A 8E 02 D8           STX   TEMPD
D81D A0 00      GETNAM  LDYIM $00     :: FIND NAME ::
D81F A2 00              LDXIM $00
D821 B1 10      GETCHR  LDAIY PTR     GET CHR IN DIR.BUF.
D823 C9 20              CMPIM $20
D825 F0 01              BEQ   SKIPSP  SKIP SPACE
D827 E8                 INX
D828 C8         SKIPSP  INY
D829 C0 06              CPYIM $06     6 CHR.S?
D82B 90 F4              BCC   GETCHR  IF NO, GET NEXT
D82D CA                 DEX           ::SAVE LENGTH OF NM::
D82E 8E 01 D8           STX   TEMPC
D831 AE E5 2C           LDX   BUFIND  :: COMPARE 2 NAMES ::
D834 A0 00              LDYIM $00
D836 8C 00 D8   GTNM    STY   TEMPA
D839 8A                 TXA
D83A A8                 TAY
D83B B1 E1              LDAIY OSIBAD  GET CMD-NAME CHR
D83D AC 00 D8           LDY   TEMPA
D840 C9 0E              CMPIM $0E     IF END CMP LENGTH
D842 90 32              BCC   CMPLNG
D844 D1 10              CMPIY PTR     COMPARE DIR-NAME
D846 D0 08              BNE   NXTDN   NO FIT, TRY NEXT
D848 E8                 INX
D849 C8                 INY
D84A C0 06              CPYIM $06     GET 6 CHR.S
D84C 90 E8              BCC   GTNM
D84E B0 26              BCS   CMPLNG  COMPARE LENGTH'S
D850 A5 10      NXTDN   LDA   PTR     :: NEXT DIR-NAME ::
D852 18                 CLC
D853 69 08              ADCIM $08     NEXT NAME IN BUFFER
D855 85 10              STA   PTR
D857 90 02              BCC   NOINC
D859 E6 11              INC   PTR     +01
D85B A5 10      NOINC   LDA   PTR
D85D 38                 SEC
D85E E9 79              SBCIM $79
D860 A5 11              LDA   PTR     +01
D862 E9 2F              SBCIM $2F
D864 D0 B7              BNE   GETNAM  GET NEXT FILENAME
D866 20 73 2D           JSR   STROUT  :: NO FILE ::
D869 0D 0A              HEX   0D0A
D86B 4E 4F 20           ASC   NO FILE
D86E 46 49 4C
D871 45
D872 0A 0D 00           HEX   0A0D00
D875 60                 RTS
D876 AD 01 D8   CMPLNG  LDA   TEMPC   COMP CMD-FN LENGTH
D879 CD 02 D8           CMP   TEMPD   WITH DIR-NM LENGTH
D87C D0 D2              BNE   NXTDN
D87E A9 00              LDAIM $00     :: FOUND IT !! ::
D880 A0 07              LDYIM $07
D882 91 10              STAIY PTR     WRITE $00 IN TRACKS
D884 88                 DEY
D885 91 10              STAIY PTR
D887 88                 DEY
D888 A9 23              LDAIM $23
D88A 91 10      PUTEMP  STAIY PTR     WRITE 'EMPTY'
D88C 88                 DEY
D88D 10 FB              BPL   PUTEMP
D88F A2 01              LDXIM $01     :: BUFFER TO DISK ::
D891 20 AE E5           JSR   WRDIR
D894 20 61 27           JSR   UNLDHD
D897 20 73 2D           JSR   STROUT  :: 'FILE ERASED' ::
D89A 0D 0A              HEX   0D0A
D89C 46 49 4C           ASC   FILE ERASED
D89F 45 20 45
D8A2 52 41 53
D8A5 45 44
D8A7 0A 0D 00           HEX   0A0D00
D8AA 60                 RTS
                ----------FINISH----------
LOYS EXTRA'S -RE-LOAD

D8B0                    ORG   $D8B0
                        TTL   LOYS EXTRA'S -RE-LOAD-
                  ++ D E F I N I T I O N S ++
00FE            MEMLO   EQU   $FE     load-pntr for sector
00FF            MEMHI   EQU   $FF
07DB            TRACE0  EQU   $07DB   tracebasiclines on/off
02C5            CMDTBL  EQU   $02C5   cmd table EDIT/RSEQ
0222            STARTA  EQU   $0222   holds ed/rseq startadr-1
376F            STARTE  EQU   $376F   edits startadr.
BB9B            STARTR  EQU   $BB9B   rseqs startadr.
BC00            EDIMOLO EQU   $BC00   edmo loadvector
C000            KOLOILO EQU   $C000   kolorator --
BB00            RSEQILO EQU   $BB00   rseq ---
E72A            ASBOOT  EQU   $E72A   boot asmbler
E71D            BABOOT  EQU   $E71D   boot basic
E737            WPBOOT  EQU   $E737   boot wordprocessor
2300            MEMSIZ  EQU   $2300   holds top of ram
2343            PRINT   EQU   $2343   print byte in A
2644            SWAPAB  EQU   $2644   swap bytes 0210..13
265C            DRIVES  EQU   $265C   holds the last used drive
265E            SECTNM  EQU   $265E   actual sectornmbr.
26BC            SETTK   EQU   $26BC   position head
2754            LDHEAD  EQU   $2754   load head
2967            READDK  EQU   $2967   read sector from disk
2AC0            ERROR   EQU   $2AC0   error message
2C4C            SETDRV  EQU   $2C4C   select drive
2CE4            BUFBYT  EQU   $2CE4   read byte incmd-buffer
2D73            STROUT  EQU   $2D73   print string
F32F            CLS     EQU   $F32F   clear screen
F707            INIKBD  EQU   $F707
                --------------------------------
D8B0 20 E4 2C           JSR   BUFBYT  GET CMD
D8B3 C9 41              CMPIM $41     A? ASSEMBLER
D8B5 D0 06              BNE   BAS
D8B7 20 0B D9           JSR   SETA
D8BA 4C 2A E7           JMP   ASBOOT
D8BD C9 42      BAS     CMPIM $42     B? BASIC
D8BF D0 06              BNE   WP
D8C1 20 0B D9           JSR   SETA
D8C4 4C 1D E7           JMP   BABOOT
D8C7 C9 57      WP      CMPIM $57     W? WORD-PROCESSOR
D8C9 D0 06              BNE   JUNMON
D8CB 20 0B D9           JSR   SETA
D8CE 4C 37 E7           JMP   WPBOOT
D8D1 C9 4D      JUNMON  CMPIM $4D     M? JUNIOR-MONITOR
D8D3 D0 06              BNE   EDMON
D8D5 20 44 26           JSR   SWAPAB
D8D8 6C FC FF           JMPI  $FFFC
D8DB C9 45      EDMON   CMPIM $45     E? EDITOR/MONITOR
D8DD D0 06              BNE   KOLOR
D8DF 20 0B D9           JSR   SETA
D8E2 4C 2B D9           JMP   EDMLO
D8E5 C9 4B      KOLOR   CMPIM $4B     K? KOLORATOR
D8E7 D0 06              BNE   RSEQ?
D8E9 20 0B D9           JSR   SETA
D8EC 4C 77 D9           JMP   KOLORLO
D8EF C9 52      RSEQ?   CMPIM $52     R? RSEQ
D8F1 D0 06              BNE   EDIT?
D8F3 20 0B D9           JSR   SETA
D8F6 4C A7 D9           JMP   RSEQLO
D8F9 C9 49      EDIT?   CMPIM $49     I? EDIT
D8FB D0 03              BNE   TRACE1
D8FD 4C F8 D9           JMP   EDITLO
D900 C9 54      TRACE1  CMPIM $54     T? TRACE
D902 D0 03              BNE   NOMORE
D904 4C 10 DA           JMP   TRACE2
D907 4C C0 2A   NOMORE  JMP   ERROR
                ---------- SUB ROUTINES -------
D90A 00         SAVDRIV HEX   00       remember last drive
D90B AD 5C 26   SETA    LDA   DRIVES
D90E 8D 0A D9           STA   SAVDRIV
D911 A9 01              LDAIM $01       allways load from dr A
D913 20 4C 2C   SETD    JSR   SETDRV
D916 60                 RTS
D917 AD 0A D9   RETDRIV LDA   SAVDRIV   return to last dr
D91A 4C 13 D9           JMP   SETD
D91D 85 FE      STAXMEM STA   MEMLO     store load vector
D91F 86 FF              STX   MEMHI
D921 60                 RTS
D922 8E 5E 26   RTTSAX  STX   SECTNM    store sectornmbr.
D925 20 BC 26           JSR   SETTK     put head on track
D928 4C 67 29           JMP   READDK    read track and return
                --------------------------------
D92B 20 54 27   EDMLO   JSR   LDHEAD    load editor/monitor
D92E A9 00              LDAIM EDIMOLO
D930 A2 BC              LDXIM EDIMOLO /256
D932 20 1D D9           JSR   STAXMEM
D935 A9 07              LDAIM $07       TRACK 07,1 -->
D937 A2 01              LDXIM $01
D939 20 22 D9           JSR   RTTSAX    $BC00 = EDMO / 1
D93C A9 00              LDAIM $00
D93E A2 C4              LDXIM $C4
D940 20 1D D9           JSR   STAXMEM
D943 A9 08              LDAIM $08       TRACK 08,1 -->
```

```
D945 A2 01              LDXIM $01
D947 20 22 D9           JSR   RTTSAX  $C400 = EDMO / 2
D94A A9 00              LDAIM $00
D94C A2 CC              LDXIM $CC
D94E 20 1D D9           JSR   STAXMEM
D951 A9 09              LDAIM $09     TRACK 09,1 -->
D953 A2 01              LDXIM $01
D955 20 22 D9           JSR   RTTSAX  $CC00 = EDMO / 3
D958 20 17 D9           JSR   RETDRIV
D95B 68                 PLA
D95C 8D 75 D9           STA   SAVE1   save return adr.
D95F 68                 PLA
D960 8D 76 D9           STA   SAVE2
D963 20 03 BC           JSR   EDIMOLO +03 goto editor/monitor
D966 20 2F F3           JSR   CLS     after exit edmo,
D969 20 07 F7           JSR   INIKBD   clear screen
D96C AD 76 D9           LDA   SAVE2   get return adr.
D96F 48                 PHA
D970 AD 75 D9           LDA   SAVE1
D973 48                 PHA
D974 60                 RTS           return to basic or dos
D975 00         SAVE1   HEX   00
D976 00                 HEX   00
                ------------------------------------
D977 20 54 27   KOLORLO JSR   LDHEAD  load kolorator
D97A A9 00              LDAIM KOLOILO
D97C A2 C0              LDXIM KOLOILO /256
D97E 20 1D D9           JSR   STAXMEM
D981 A9 20              LDAIM $20     track 20,1-->
D983 A2 01              LDXIM $01
D985 20 22 D9           JSR   RTTSAX  $C000 KOLOR./1
D988 A9 00              LDAIM $00
D98A A2 C8              LDXIM $C8
D98C 20 1D D9           JSR   STAXMEM
D98F A9 21              LDAIM $21     track 21,1-->
D991 A2 01              LDXIM $01
D993 20 22 D9           JSR   RTTSAX  $C800 KOLOR./2
D996 20 17 D9           JSR   RETDRIV
D999 A9 02              LDAIM KOLOILO +02 set device #2 outp
D99B A2 C0              LDXIM KOLOILO /256 to kolor.
D99D 8D 13 23           STA   MEMSIZ  +13
D9A0 8E 14 23           STX   MEMSIZ  +14
D9A3 20 00 C0           JSR   KOLOILO initiate kolor.
D9A6 60                 RTS           return to basic or dos
                ------------------------------------
D9A7 20 54 27   RSEQLO  JSR   LDHEAD
D9AA A9 00              LDAIM RSEQILO
D9AC A2 BB              LDXIM RSEQILO /256
D9AE 20 1D D9           JSR   STAXMEM
D9B1 A9 35              LDAIM $35     track 35,1 -->
D9B3 A2 01              LDXIM $01
D9B5 20 22 D9           JSR   RTTSAX  $BB00 RSEQ
D9B8 20 17 D9           JSR   RETDRIV
D9BB A0 BA .            LDYIM $BA     memory top $BA00
D9BD A9 9B              LDAIM STARTR  start rseq $BB9B -1
D9BF A2 BB              LDXIM STARTR  /256
D9C1 20 CB D9           JSR   STAADR  startadr.to dos cmdtab'
D9C4 A0 FF              LDYIM $FF     counter
D9C6 A2 00              LDXIM TABL1   -TABL1
D9C8 4C D5 D9           JMP   WRCMD   write RSEQ in cmdtab'
D9CB 8D 22 02   STAADR  STA   STARTA
D9CE 8E 23 02           STX   STARTA  +01
D9D1 8C 00 23           STY   MEMSIZ
D9D4 60                 RTS
D9D5 BD 08 DA   WRCMD   LDAX  TABL1
D9D8 20 43 23           JSR   PRINT
D9DB C8                 INY
D9DC C0 03              CPYIM $03
D9DE D0 03              BNE STACMD
D9E0 18                 CLC
D9E1 69 80              ADCIM $80
D9E3 99 C5 02   STACMD  STAY  CMDTBL
D9E6 E8                 INX
D9E7 C0 03              CPYIM $03
D9E9 D0 EA              BNE   WRCMD
D9EB 20 73 2D           JSR   STROUT
D9EE 20 45 4E           ASC    ENABLED
D9F1 41 42 4C
D9F4 45 44
D9F6 00                 HEX   00
D9F7 60                 RTS           return to basic or dos
                ------------------------------
D9F8 A0 BF      EDITLO  LDYIM $BF     memorytop $BF00
D9FA A9 6F              LDAIM STARTE  ed startadr.to cmdtab'
D9FC A2 37              LDXIM STARTE  /256
D9FE 20 CB D9           JSR   STAADR
DA01 A0 FF              LDYIM $FF     counter
DA03 A2 04              LDXIM TABL2   -TABL1
DA05 4C D5 D9           JMP   WRCMD   write EDIT in cmdtab'
DA08 52 53 45   TABL1   ASC   RSEQ
DA0B 51
DA0C 45 44 49   TABL2   ASC   EDIT
DA0F 54
                ------------------------------
DA10 A9 00      TRACE2  LDAIM $00     toggle trace on/off
DA12 49 01              EORIM $01
DA14 8D 11 DA           STA   TRACE2  +01
DA17 F0 05              BEQ   TRA-OFF
DA19 A2 00              LDXIM TABL3   -TABL3
DA1B 4C 20 DA           JMP   TRACE3

DA1E A2 05      TRA-OFF LDXIM TABL4   -TABL3
DA20 A0 00      TRACE3  LDYIM $00
DA22 BD 2F DA   TRACE4  LDAX  TABL3
DA25 99 DB 07           STAY  TRACE0
DA28 E8                 INX
DA29 C8                 INY
DA2A C0 04              CPYIM $04
DA2C D0 F4              BNE   TRACE4
DA2E 60                 RTS           return to basic
DA2F 20 D8 1C   TABL3   HEX   20D81CEAEA
DA32 EA EA
DA34 18 90 02   TABL4   HEX   189002E6C8
DA37 E6 C8
                ------------------------------------
LOYS 3.1 EXTRA'S -AUTOLINE-

DA70                    ORG   $DA70
                        TTL   LOYS 3.1 EXTRA'S -AUTOLINE-
                   ::: TEMPORARY REGISTERS :::
DA60            TEMPA   EQU   $DA60
DA61            LNL     EQU   TEMPA   +01 LINE NR.
DA62            LNH     EQU   TEMPA   +02
DA63            INCHR   EQU   TEMPA   +03 INCREMENT
DA64            INCRL   EQU   TEMPA   +04
DA65            INPUT   EQU   TEMPA   +05 CHARACTER BUFFER
DA66            LINPRO  EQU   TEMPA   +06 LINE INP IN PROG FLG
DA68            FIGCNT  EQU   TEMPA   +08 CHR COUNTER, LINE NO
DA69            COUNT   EQU   TEMPA   +09
DA6A            OUTLN   EQU   TEMPA   +0A OUT BUFFER LINE NO
DA6B            CLNL    EQU   TEMPA   +0B
DA6C            CLNH    EQU   TEMPA   +0C
DA6D            TEMPX   EQU   TEMPA   +0D
DA6E            TEMPY   EQU   TEMPA   +0E
DA6F            AUTOFL  EQU   TEMPA   +0F AUTOLINE ON/OFF FL
E7C2            PARBL   EQU   $E7C2
E7C3            PARBH   EQU   PARBL   +01
                   ::: EXTERNAL ADDRESSES :::
F32F            RESET   EQU   $F32F   CLEAR SCREEN
FA90            IPB     EQU   $FA90   INPUT MATRIX
FA21            RESPAR  EQU   $FA21   RESET PARAL &PARBL
2D73            STROUT  EQU   $2D73   PRINT STRING
F71D            RECHA   EQU   $F71D   GET CHR FROM KBD
0474            BASIC   EQU   $0474   BASIC WARM
2336            INBAS   EQU   $2336   BASIC INPUTVEC
0588            BASIN   EQU   $0588   BASIC IN
00CC            INL     EQU   $00CC
00CD            INH     EQU   $00CD
                ------------------------
DA70 20 1D F7           JSR   RECHA   CHANGE ADR $DF48,49
DA73 C9 40              CMPIM $40      TO 70,DA
DA75 F0 01              BEQ   TSAVER  COMMERCIAL AT TOGGLES
DA77 60                 RTS
                ------------------------
DA78 AD 6F DA   TSAVER  LDA   AUTOFL
DA7B 49 FF              EORIM $FF
DA7D 8D 6F DA           STA   AUTOFL
DA80 F0 03              BEQ   AUTO
DA82 4C 7F DB           JMP   BACK    AUTOLINE OFF
                ------------------------
DA85 A5 CC      AUTO    LDA   INL     SAVE INL&INH FOR LATER
DA87 8D 6D DA           STA   TEMPX    USE IN BASIC
DA8A A5 CD              LDA   INH
DA8C 8D 6E DA           STA   TEMPY
DA8F 20 73 2D           JSR   STROUT
DA92 0D 0A              HEX   0D0A
DA94 53 54 41           ASC   START LINE
DA97 52 54 20
DA9A 4C 49 4E
DA9D 45 20
DA9F 00                 HEX   00
DAA0 20 BC DB           JSR   TXT     '4 DIGITS'
DAA3 20 21 FA           JSR   RESPAR  GET PARAMETERS
DAA6 20 90 FA           JSR   IPB
DAA9 AD C2 E7           LDA   PARBL
DAAC 8D 62 DA           STA   LNH
DAAF 8D 6C DA           STA   CLNH
DAB2 AD C3 E7           LDA   PARBH
DAB5 8D 61 DA           STA   LNL     START LINE
DAB8 8D 6B DA           STA   CLNL
DABB 20 73 2D           JSR   STROUT
DABE 0D 0A              HEX   0D0A
DAC0 49 4E 43           ASC   INCREMENT
DAC3 52 45 4D
DAC6 45 4E 54
DAC9 20 20
DACB 00                 HEX   00
DACC 20 8C DB           JSR   TXT
DACF 20 21 FA           JSR   RESPAR  GET PARAMETERS
DAD2 20 90 FA           JSR   IPB
DAD5 AD C2 E7           LDA   PARBL
DAD8 8D 64 DA           STA   INCRL   INCREMENTS
DADB AD C3 E7           LDA   PARBH
DADE 8D 63 DA           STA   INCRH
                ------------------------
DAE1 AD 6D DA           LDA   TEMPX   RESTORE INL AND INH
DAE4 85 CC              STA   INL
DAE6 AD 6E DA           LDA   TEMPY
DAE9 85 CD              STA   INH
DAEB 18                 CLC
DAEC A9 06              LDAIM BEGIN   CHANGE INPVEC
```

```
DAEE 8D 88 05          STA   BASIN
DAF1 A9 DB             LDAIM BEGIN   /256
DAF3 8D 89 05          STA   BASIN   +01
DAF6 A9 0D             LDAIM $0D
DAF8 8D 65 DA          STA   INPUT
DAFB A9 00             LDAIM $00
DAFD 8D 66 DA          STA   LINPRO  RESET LINEPRO
DB00 20 2F F3          JSR   RESET
DB03 4C 74 04          JMP   BASIC    TO BASIC
                       ----------------------
DB06 98        BEGIN   TYA   NEW     INPUT ROUTINE
DB07 48                PHA
DB08 AC 65 DA          LDY   INPUT
DB0B C0 0D             CPYIM $0D     IF CR, INC LIN NR
DB0D F0 0C             BEQ   INCREM
DB0F 20 36 23  NEW     JSR   INBAS   GET CHR FROM KBD
DB12 8D 65 DA          STA   INPUT
DB15 68                PLA
DB16 A8                TAY
DB17 AD 65 DA          LDA   INPUT
DB1A 60                RTS           NORMAL PROC. CHR
                       ----------------------
DB1B AD 66 DA  INCREM  LDA   LINPRO  AUTOLINE ROUTINE
DB1E D0 08             BNE   NFIRST
DB20 A9 04             LDAIM $04     4 DIGITS
DB22 8D 66 DA          STA   LINPRO
DB25 8D 68 DA          STA   FIGCNT
DB28 AD 68 DA  NFIRST  LDA   FIGCNT
DB2B F0 2A             BEQ   LAST
DB2D A9 00             LDAIM $00
DB2F 8D 60 DA          STA   TEMPA
DB32 A9 04             LDAIM $04
DB34 8D 69 DA          STA   COUNT
DB37 18        SHIFT   CLC
DB38 2E 62 DA          ROL   LNH     SHIFT NEXT DIGIT TO
DB3B 2E 61 DA          ROL   LNL      LINE NO.
DB3E 2E 60 DA          ROL   TEMPA
DB41 CE 69 DA          DEC   COUNT
DB44 D0 F1             BNE   SHIFT
DB46 CE 68 DA          DEC   FIGCNT
DB49 AD 60 DA          LDA   TEMPA   CONVERT LINENR >
DB4C 69 30             ADCIM $30      ASCII
DB4E 8D 6A DA  NSPLIT  STA   OUTLN
DB51 68                PLA           RESTORE Y REG.
DB52 A8                TAY
DB53 AD 6A DA          LDA   OUTLN
DB56 60                RTS
                ::: PREPARE FOR NEXT LINE :::
DB57 A9 20     LAST    LDAIM $20
DB59 8D 65 DA          STA   INPUT
DB5C A9 00             LDAIM $00
DB5E 8D 66 DA          STA   LINPRO
DB61 F8                SED
DB62 18                CLC
DB63 AD 6C DA          LDA   CLNH
DB66 6D 64 DA          ADC   INCRL
DB69 8D 6C DA          STA   CLNH
DB6C 8D 62 DA          STA   LNH
DB6F AD 6B DA          LDA   CLNL
DB72 6D 63 DA          ADC   INCRH
DB75 8D 6B DA          STA   CLNL
DB78 8D 61 DA          STA   LNL
DB7B D8                CLD
DB7C B8                CLV
DB7D 50 90             BVC   NEW     BACK TO INPUT ROUT.
                       ----------------------
DB7F A9 36     BACK    LDAIM $36     RESTORE OLD INVEC
DB81 8D 88 05          STA   BASIN
DB84 A9 23             LDAIM $23
DB86 8D 89 05          STA   BASIN   +01
DB89 4C 74 04          JMP   BASIC
                       ----------------------
DB8C 20 73 2D  TXT     JSR   STROUT
DB8F 20 28 34          ASC    (4 DIGITS)
DB92 20 44 49
DB95 47 49 54
DB98 53 29 20
DB9B 00                HEX   00
DB9C 60                RTS
                       ----------------------
LOYS EXTRA'S -SHORTHAND-

DBA0                   ORG   $DBA0
                       TTL   LOYS EXTRA'S -SHORTHAND-
                       ----------------------
F71D           RECCHA  EQU   $F71D   GET CHR. FROM KBD
E660           TEMPY   EQU   $E660
E6A9           OLDRUT  EQU   $E6A9   ORG. SHORTH.
E6A4           GETCMD  EQU   $E6A4
0284           BASCOM  EQU   $0284   BASIC CMD. TABL
                       ----------------------
DBA0 20 1D F7          JSR   RECCHA  GET CHR.
DBA3 A0 00             LDYIM TBL1    -TBL1
DBA5 C9 4B             CMPIM 'K      disk!"
DBA7 F0 3B             BEQ   SAVEY
DBA9 A0 06             LDYIM TBL2    -TBL1
DBAB C9 3A             CMPIM ':      print#2,chr$(18)"
DBAD F0 35             BEQ   SAVEY
DBAF A0 13             LDYIM TBL3    -TBL1
DBB1 C9 2F             CMPIM '/      rnd(1)
DBB3 F0 2F             BEQ   SAVEY
DBB5 A0 19             LDYIM TBL4    -TBL1
DBB7 C9 48             CMPIM 'H      chr$(
DBB9 F0 29             BEQ   SAVEY
DBBB A0 1E             LDYIM TBL5    -TBL1
DBBD C9 26             CMPIM '&      print&(
DBBF F0 23             BEQ   SAVEY
DBC1 A0 25             LDYIM TBL6    -TBL1
DBC3 C9 45             CMPIM 'E      peek(
DBC5 F0 1D             BEQ   SAVEY
DBC7 A0 2A             LDYIM TBL7    -TBL1
DBC9 C9 7B             CMPIM '{      disk!"re
DBCB F0 17             BEQ   SAVEY
DBCD A0 33             LDYIM TBL8    -TBL1
DBCF C9 7D             CMPIM '}      disk!"put
DBD1 F0 11             BEQ   SAVEY
DBD3 A0 3D             LDYIM TBL9    -TBL1
DBD5 C9 7C             CMPIM '|      disk!"lo
DBD7 F0 0B             BEQ   SAVEY
                       ----------------------
DBD9 A0 84             LDYIM BASCOM  if not any, then
DBDB 8C A9 E6          STY   OLDRUT  restore old rout.
DBDE A0 02             LDYIM BASCOM  /256
DBE0 8C AA E6          STY   OLDRUT  +01
DBE3 60                RTS           and return.
                       ----------------------
DBE4 8C 60 E6  SAVEY   STY   TEMPY   if one of these
DBE7 A9 F5             LDAIM TBL1    -01
DBE9 A0 DB             LDYIM TBL1    /256
DBEB 8D A9 E6          STA   OLDRUT  then set ptr. to
DBEE 8C AA E6          STY   OLDRUT  +01 this routine
DBF1 68                PLA
DBF2 68                PLA
DBF3 4C A4 E6          JMP   GETCMD  and write string
                       ----------------------
DBF6 44 49 53  TBL1    ASC   DISK!
DBF9 4B 21
DBFB A2                HEX   A2
DBFC 50 52 49  TBL2    ASC   PRINT#2,(18)
DBFF 4E 54 23
DC02 32 2C 28
DC05 31 38 29
DC08 A2                HEX   A2
DC09 52 4E 44  TBL3    ASC   RND(1
DC0C 28 31
DC0E A9                HEX   A9
DC0F 43 48 52  TBL4    ASC   CHR$
DC12 24
DC13 A8                HEX   A8
DC14 50 52 49  TBL5    ASC   PRINT&
DC17 4E 54 26
DC1A A8                HEX   A8
DC1B 50 45 45  TBL6    ASC   PEEK
DC1E 4B
DC1F A8                HEX   A8
DC20 44 49 53  TBL7    ASC   DISK!"RE
DC23 4B 21 22
DC26 52 45
DC28 A0                HEX   A0
DC29 44 49 53  TBL8    ASC   DISK!"PUT
DC2C 4B 21 22
DC2F 50 55 54
DC32 A0                HEX   A0
DC33 44 49 53  TBL9    ASC   DISK!"LO
DC36 4B 21 22
DC39 4C 4F
DC3B A0                HEX   A0
                       ----------------------
LOYS EXTRA'S -ERROR-

DC40                   ORG   $DC40
                       TTL   LOYS EXTRA'S -ERROR-

2343           PRINT   EQU   $2343

DC40 AA                TAX
DC41 CA                DEX
DC42 BC 52 DC          LDYX  TABLE1
DC45 B9 60 DC  PRINTE  LDAY  ERR1
DC48 F0 07             BEQ   EPRINT
DC4A 20 43 23          JSR   PRINT
DC4D C8                INY
DC4E 4C 45 DC          JMP   PRINTE
DC51 60        EPRINT  RTS
DC52 00        TABLE1  DFB   ERR1    -ERR1
DC53 07                DFB   ERR2    -ERR1
DC54 0E                DFB   ERR3    -ERR1
DC55 16                DFB   ERR4    -ERR1
DC56 24                DFB   ERR5    -ERR1
DC57 29                DFB   ERR6    -ERR1
DC58 39                DFB   ERR7    -ERR1
DC59 40                DFB   ERR8    -ERR1
DC5A 4E                DFB   ERR9    -ERR1
DC5B 5B                DFB   ERRA    -ERR1
DC5C 69                DFB   ERRB    -ERR1
DC5D 7B                DFB   ERRC    -ERR1
DC5E 83                DFB   ERRD    -ERR1
DC5F 95                DFB   ERRE    -ERR1
DC60 50 41 52  ERR1    ASC   PARITY
DC63 49 54 59
```

```
DC66 00                 HEX   00
DC67 52 45 52  ERR2     ASC   REREAD
DC6A 45 41 44
DC6D 00                 HEX   00
DC6E 54 52 41  ERR3     ASC   TRACK 0
DC71 43 4B 20
DC74 30
DC75 00                 HEX   00
DC76 57 52 49  ERR4     ASC   WRITE PROTECT
DC79 54 45 20
DC7C 50 52 4F
DC7F 54 45 43
DC82 54
DC83 00                 HEX   00
DC84 53 45 45  ERR5     ASC   SEEK
DC87 4B
DC88 00                 HEX   00
DC89 44 52 49  ERR6     ASC   DRIVE NOT READY
DC8C 56 45 20
DC8F 4E 4F 54
DC92 20 52 45
DC95 41 44 59
DC98 00                 HEX   00
DC99 53 59 4E  ERR7     ASC   SYNTAX
DC9C 54 41 58
DC9F 00                 HEX   00
DCA0 42 41 44  ERR8     ASC   BAD TRACK NMR
DCA3 20 54 52
DCA6 41 43 4B
DCA9 20 4E 4D
DCAC 52
DCAD 00                 HEX   00
DCAE 54 52 41  ERR9     ASC   TRACK HEADER
DCB1 43 4B 20
DCB4 48 45 41
DCB7 44 45 52
DCBA 00                 HEX   00
DCBB 53 45 43  ERRA     ASC   SECTOR HEADER
DCBE 54 4F 52
DCC1 20 48 45
DCC4 41 44 45
DCC7 52
DCC8 00                 HEX   00
DCC9 42 41 44  ERRB     ASC   BAD SECTOR LENGTH
DCCC 20 53 45
DCCF 43 54 4F
DCD2 52 20 4C
DCD5 45 4E 47
DCD8 54 48
DCDA 00                 HEX   00
DCDB 4E 4F 20  ERRC     ASC   NO FILE
DCDE 46 49 4C
DCE1 45
DCE2 00                 HEX   00
DCE3 52 2F 57  ERRD     ASC   R/W PAST FILE-END
DCE6 20 50 41
DCE9 53 54 20
DCEC 46 49 4C
DCEF 45 2D 45
DCF2 4E 44
DCF4 00                 HEX   00
DCF5 44 49 53  ERRE     ASC   DISK FULL
DCF8 4B 20 46
DCFB 55 4C 4C
DCFE 00                 HEX   00
```

```
 10 REM=============================================================
 20 REM= CLOCK FOR ACORN-ATOM          BY JOHN ANIJS    870714 =
 30 REM= THIS PROGRAM HAS BEEN DERIVED FROM THE PROGRAM WRITTEN=
 40 REM= BY R.V.VUGT FOR BBC AND ELECTRON (DE 6502 KENNER 50). =
 50 REM= THIS PROGRAM WORKS ONLY PROPERLY IN MODE 0, AND SHOWS =
 60 REM= THE TIME IN THE UPPER RIGHTHAND CORNER OF THE SCREEN. =
 70 REM= THE PROGRAMCODE MAY BE PLACED IN (E)PROM. (VAR. S&T)  =
 80 REM= RUNTIME VARIABLES ARE ALLOCATED BY VAR. R. (9 BYTES)  =
 90 REM= THE VIA HAS TO BE INSTALLED WITH IRQ-LINE CONNECTED.  =
100 REM= THE CLOCKPROGRAM IS BASED ON 50 mS INTERRUPT.         =
110 REM= THE PROGRAM IS STARTED BY: LINK MM0,OR LINK<ADDR> (=T)=
120 REM= TIMESETTING IS BY MEANS OF COMMAND: *TIME hh mm ss    =
130 REM=============================================================
140 I=#204;REM INTERRUPT VECTOR
150 J=#206;REM OSCLI VECTOR
160 V=#B800;REM VIA ADDRESS
170 S=#3800;REM OBJECT START AFTER ASSEMBLY
180 T=#3800;REM CODE START FOR EXECUTION
190 R=#3800;REM RAM ADDRESS
```

```
200 DIMLL31,MM31;F.N=0TO31;LLN=#777:MMN=#777;N.
210 P.'"ASSEMBLY PHASE 1",$21
220 GOS.a
230 F.N=0TO31;MMN=LLN-5+T;N.
240 P.$6,'"ASSEMBLY PHASE 2"',$21
250 GOS.a;P.$6
260 END
270aP=S
280[
290:LL0;SEI;LDA I;STA R;LDA I+1;STA R+1
300LDA @MM2&#FF;STA I;LDA @MM2/256;STA I+1
310LDA J;STA R+2;LDA J+1;STA R+3
320LDA @MM8&#FF;STA J;LDA @MM8/256;STA J+1
330LDA @#C0;STA V+#E;LDA @#40;STA V+#B;LDA @#4E;STA V+6
340LDA @#C3;STA V+5;CLI;RTS
350:LL2;TXA;PHA;TYA;PHA
360DEC R+4;BNE LL1;LDA @20;STA R+4
370SED;LDA @0;SEC;ADC R+5;STA R+5;CMP @#60;BNE LL3
380LDA @0;STA R+5;SEC;ADC R+6;STA R+6;CMP @#60;BNE LL3
390LDA @0;STA R+6;SEC;ADC R+7;STA R+7;CMP @#24;BNE LL3
400LDA @0;STA R+7
410:LL3;LDA R+5;LDX @7;JSR MM4;JSR MM6
420LDA R+6;JSR MM4;JSR MM6;LDA R+7;JSR MM4
430:LL1;LDA @#5A;STA V+#D
440PLA;TAY;PLA;TAX;PLA
450JMP (R)
460:LL4;PHA;JSR MM5;PLA
470LSRA;LSRA;LSRA;LSRA
480:LL5;AND @#F;ORA @#30
490:LL7;STA #B018,X;DEX;RTS
500:LL6;LDA @CH":";JMP MM7
510:LL8;LDY @0;LDX @0;JSR #F876
520:LL9;LDA #100,Y;CMP MM9,X;BEQ LL10;JMP (R+2)
530:LL10;INY;INX;CPX @4;BNE LL9;LDX @2
540:LL11;JSR #F876;LDA #100,Y;ASLA;ASLA;ASLA;ASLA;STA R+8
550INY;LDA #100,Y;AND @#F;ORA R+8;STA R+5,X;INY;DEX;BPL LL11
560RTS
570:LL9;];$P="TIME";P=P+LENP;[
580]
590R.
600*****************************************************************
610 PROGRAM-DESCRIPTION
620 L.200:     DEFINITION AND INITIALIZATION OF LABELS.
630 L.290-320: INITIALIZATION OF VECTORS FOR INTERRUPT AND
640            COMMAND LINE INTERPRETER.
650 L.330-340: INITIALIIZATION OF VIA (6522).
660 L.350-450: INTERRUPT SERVICE ROUTINE.
670 L.460-500: CLOCK-DISPLAY ROUTINE.
680 L.510-570: COMMAND INTERPRETER.
690\USED REGISTERS: R/R+1:   INTERRUPT VECTOR
700\                R+2/R+3: COMAND LINE INTERPRETER VECTOR
710                 R+4:     50 mS COUNTER
720                 R+5:     SEC. COUNTER (BCD)
730                 R+6:     MIN. COUNTER (BCD)
740                 R+7:     HRS. COUNTER (BCD)
750                 R+8:     UTILITY REGISTER
760 EXTRNAL USED ROUTINE: #F876: SKIP SPACES FROM INPUT BUFFER
770*****************************************************************
```

```
**********************************************************
*                    O C T O F A T E                     *
*                FATE for the Octopus                    *
**********************************************************
```

By : Coen Boltjes, The Netherlands
Transl.: Elja v.d. Veer, The Netherlands

The latest offspring of the Octopus software family is OCTOFATE. Even before OCTOFATE is available, it already has become a legend because it is a version of FATE adjusted to Elektor's EC65/Octopus computer by our member Marc Lachaert. And FATE is well-known for Elektor's Junior computer.

OCTOFATE's heart is formed by the Text Editor, an extremely powerful line editor, which can make and change OCTOFATE files in a simple and user-minded way. Closely related to this are the commands of the Disk Operating System especially deviced for OCTOFATE, which can transport files from and to disks.
For reasons of upwards compatability of OCTOFATE tape routines are also implemented, so the FATE files of the Junior can be read without any problems. Naturally, the tape routines can be used for making backup files on tape as well.

Different modules can be called from the Text Editor:

-The Format Lister. This programme can print out texts according to a given format. The programme takes care of page numbers, headlines, transfering to new pages etc. etc. The text to be printed can in principle be infinetely long, because linked files can be used. This enables one to place a command at the end of a file so that a subsequent file can be read.
A consequence of this possibility is that texts can be divided in well-ordered modules (e.g. chapters, paragraphs) while the Format Lister is regarding it as a whole.

-The Assembler is the second module. This concerns a 2-pass conditional assembler using the MOS-Technology notation. In this way it is always clear which addressing mode is refered to, contrary to the Micro-ADE notation.
The time needed for assembling a source is very short: approximately 7.5 seconds for 1K object code on 1 Mhz.
As the Format Lister, the Assembler can also make use of linked files, so that large programmes can be assembled as well. In the OSI- and the Micro-ADE assembler one must limit the sources to about 1500 lines, because otherwise there will be no room in the available memory anymore for the source, symbol table and object code. A nightmare for many programme-makers, which now belongs to the past with OCTOFATE.
In OCTOFATE it is possible to read the sources from disk per track, to assemble them and to store the object code directly on the disk, so that 28K can be reserved for the symbol table.

-In software advertisements it is often claimed that adjustments to individual wishes and the configuration of the user are simple. In that case "only few things" have to be done...
With OCTOFATE efforts were made to make life as easy as possible for the user. Therefore, a configurator is introduced as a third module in order to facilitate adjusting OCTOFATE to any system. In this way all default values (line length, source start etc.), disk drive configurations and so on can be given and stored as a configuration on disk. Additionally, the guiding system of the printer can simply be adjusted to any printer, so that it can underline a text by means of a simple command, or it can switch over to another type of characters in a simple way. All this can be done without having to consult the printer's manual every time. At the system disk there is room for seven configurations. Thus, the use of different kinds of printers will not present any problems.

Future plans are to develop a File Convertor which can change Micro-ADE and OSI-Assembler files into FATE format. At this moment a Full Screen Editor for OCTOFATE is worked on.

For good operating of OCTOFATE a standard EC65/Octopus suffices. However, the use of Tape Utilities and the "Bell" requires the Basicode Interface Card from Elektor's Computing Special 2.

At this moment the following is available for OCTOFATE:

-OCTOFATE System Disk, including the Text Editor, Format Lister, Assembler and Configurator.
-OCTOFATE User Manual containing 90 pages explaining the software (for the time being only a Dutch version).
-OCTOFATE Source Listings in 6502 assembler (English in Micro-ADE and MOS-Technology notation).

1. Editor, Tape I/O	97 pages
2. DOS	67 pages
3. Assembler	80 pages
4. Default Table	10 pages
5. Format Lister	10 pages
6. Configurator	34 pages

At the september meeting a demonstration of OCTOFATE can be given. Those who are interested are welcome.

PAPERWARE & DISKETTE SERVICE OCTOFATE FOR EC65/OCTOPUS

Paying with Eurocheque or on postgiro 841433 of W.L. van Pelt at Krimpen a.d. IJssel: subtract Hfl 9,50. Otherwise:

-OCTOFATE System Disk.
Send an empty diskette to the editorial office, including a label and R/W prot.

Europe : Hfl. 74,50	Outside Europe : Hfl. 91,50
Members: Hfl. 24,50	Members: Hfl. 41,50

-OCTOFATE User Manual.

Europe : Hfl.104,50	Outside Europe : Hfl.121,50
Members: Hfl. 54,50	Members: Hfl. 71,50

-OCTOFATE Source Listings.

1. Editor, Tape I/O.	
Europe : Hfl.108,00	Outside Europe : Hfl.125,00
Members: Hfl. 58,00	Members: Hfl. 75,00
2. Disk Operating System.	
Europe : Hfl. 93,00	Outside Europe : Hfl.110,00
Members: Hfl. 43,00	Members: Hfl. 60,00
3. Assembler.	
Europe : Hfl. 99,50	Outside Europe : Hfl.116,50
Members: Hfl. 49,50	Members: Hfl. 66,50
4. Default Table.	
Europe : Hfl. 64,50	Outside Europe : Hfl. 81,50
Members: Hfl. 14,50	Members: Hfl. 31,50
5. Format Lister.	
Europe : Hfl. 64,50	Outside Europe : Hfl. 81,50
Members: Hfl. 14,50	Members: Hfl. 31,50
6. Configurator.	
Europe : Hfl. 79,50	Outside Europe : Hfl. 96,50
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Editor, Tape I/O + DOS + Assembler + Default Table + Format Lister + Configurator + MANUAL:

Europe : Hfl.256,50	Outside Europe : Hfl.273,50
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BRIEF AAN DE REDAKTIE

A.P. Oerlemans, Oss

In editie 50 van DE 6502 KENNER zag ik onder het hoofd CALCUATOR een rekenmachine, welke in de verschillende talstelsels rekent. Misschien is het nuttig om erop te wijzen dat er een SHARP-EL506P calculator bestaat voor de prijs van Hfl. 29,95, bij Kwantum-Hallen, met binaire, octale en hexadecimale berekening. In het binaire stelsel wordt met de 2-complements methode gerekend. De ingevoerde getallen lopen dan van 1000000000 tot en met 111111111 (binair), óf van -512 tot en met 511 (decimaal).

OCTOPUS INPUTVERWERKING

A.P. Oerlemans, Oss.

Bij de OCTOPUS wordt na een INPUT de programmaverwerking gestopt, als uitsluitend de <RETURN>-toets wordt ingedrukt, wat vervelend kan zijn. Ik heb hierop het volgende programma-onderdeel bedacht:

```
10000 REM INPUTVERWERKING
10010 X$="":Z=1
10020 DISK!"GO F71D":Y=PEEK(9059):Y$=CHR$(Y):PRINTY$:IFY=
      13THEN10050
10030 IFY$="-"THENZ=-1:GOTO10020
10040 X$=X$+Y$:GOTO10020
10050 X=VAL(X$)*Z:PRINT:RETURN
```

Z=1 in regel 10010 geeft de mogelijkheid om ook negatieve getallen te kunnen verwerken (zie regel 10030 en 10050).
Subroutine F71D wacht op een toetsaanslag en plaatst de waarde hiervan in het (decimale) adres 9059.
Uiteraard kunnen in 10010 Z=1, de regel 10030 en in 10050 X=VAL(X$) vervallen als men alleen in string-variabelen is geïnteresseerd. Bovenstaande routine keert terug met nul als alleen de <RET>-toets wordt ingedrukt (of als het eerste teken een letterteken is).

* PRINT YOUR GRAPHICS FOR ATARI 600 XL *

By: Henk Speksnijder, The Netherlands.

In addition to the program published in February 1987 here is a program to print what's on your screen.
Most matrix printers use seven needles in a column while the Atari has 8 dots in a row (in graphics 8). When you try to print things, you'll discover that a very large Basic program is needed. This is a task much better to do in machine code (at least some of it).
This program is tested on ATARI 60 XL with ATARI INTERFACE 850 and a SEIKOSHA GP-100A MARK II.
The printer must be able to print graphics.
If your printer needs other commands, change them, this printer has following commands:

CR	carriage return	CHR$(13)
DC4	no linefeed after printing	CHR$(20)
BS	graphics mode	CHR$(8)
S0	double width character	CHR$(14)
S1	standard character	CHR$(15)
POS	print starting position	CHR$(16)
ESC	escape	CHR$(27)
FS	repeat graphics character	CHR$(28)

```
 30 P=0                                          Machinecode in
 32 FOR I=0 TO 36                                workarea
 34 READ C:P=P+C:POKE1570+I,C
 36 NEXT I
 38 IF P<>4477 THEN STOP                         test checksum
 40 DATA 104,104,133,213,104,133,212
 42 DATA 169,255,32,61,6,160,240
 44 DATA 177,212,32,61,6,152,56
 46 DATA 233,40,168,176,244,96,162
 48 DATA 7,74,62,24,6,202,16
 50 DATA249,96

500 OPEN #2,8,0,"P:"                             printer in
510 PUT #2,8:PUT #2,16:PUT #2,0:PUT #2,15        graphics mode
520 FOR V=0 TO 153 STEP 7                        top to bottom
530 FOR H=0 TO 39                                left to right
540 P=B+H+40*V                                   calculate addr
                                                 in video Ram
550 C=USR(1570,P)                                call mach.code
560 FOR I=1560 TO 1567                           bring 8 bytes
570 PUT #2,PEEK(I)                               to the printer
580 NEXT I
590 NEXT H
600 PUT #2,13:PUT #2,16:PUT #2,0:PUT #2,15       send printer
610 NEXT V                                       to next line
620 PUT #2,15                                    printer back
630 CLOSE #2                                     to characters
```

If this program is not used together with the program of the February issue page 26, then add this:

```
100 GRAPHICS 8
110 C=PEEK(560)+256*PEEK(561)
120 B=PEEK(C+4)+256*PEEK(C+5)
```

Between line 120 and 500 you must create something on your screen. Otherwise you'll see nothing printed.
If the computer is not in GRAPHICS 8 when it comes at line 500, then nothing dangerous can happen; all you'll get is that your printer creates anything but graphics.
As mentioned before: the commands at line 510, 600 and 620 may vary, depending on the printer and the interface.

If you want it's possible to change line 520 or 530 but
H must be bigger than 0 and not bigger than 39
V must be bigger than 0 and not bigger than 159
for instance with:

```
520 FOR V=0 TO 79 STEP 7
530 FOR H=20 TO 39
```

Then only the upper right part of the screen will be printed.

This printer needs that in graphics: there are 8 bits, seven correspond with a needle but the MSB must be one. If your printer needs a zero then change line 42:

```
 42 DATA 169,0,32,61,6,160,240
```

* SEABATTLE *

A BASIC PROGRAMME

Transl.: Bart van Pelt, The Netherlands.

In this game you are considered to be the commander of a navy vessel. Your ship is charged with coast-guarding. Your mission is: "destroy every enemy ship in coastal waters". The coastal water are a sea drawn as a square of 100 times 100 points. This square has a horizontal line X and a vertical line Y. You will destroy the enemy vessel by missiles. These missiles will be launched by stating an X and Y coordinate. After the missile is launched, you will be told the distance between the target and the missile impact. A grazing shot will also be stated. After the fifth graze the enemy ship will be moved to another coordinate by the computer. So the searching starts again. The game has a difficulty scale which is defined by 3 variables, that have to be stated by you.

GRAZE AREA	=	VARIABLE A
SPEED AND DIRECTION OF THE SHIP	=	VARIABLE B
CERTAIN CHANGES OF COURSE	=	VARIABLE C

You will also be asked to state a number between 0 and 1. This is to be done by entering a point and thereafter five figures.

ADVICE TO THE PLAYER :

BEGINNER	9	0	0
AMATEUR	7	3	2
EXERCISED	6	6	4
MASTER	4	10	5
EXPERT	3	12	6

```
 10 REM PUT YOUR CLEAR SCREEN COMMAND IN THIS LINE
 20 PRINT"YOU RECEIVED A MESSAGE THAT AN ENEMY SHIP"
 30 PRINT"HAS INVADED"
 40 PRINT
 50 INPUT"ENTER A,B,C SEPARATED BY COMMA'S  ";A,B,C
 60 INPUT"ENTER ANY NUMBER, E.G.  .12345  ";S
 70 GOSUB 330
 80 A1=D
 90 GOSUB 330
100 A2=D
110 A3=5 : A0=5
120 GOSUB 290
130 A1=A1 + D
140 GOSUB 290
150 A2=A2 + D
160 PRINT"DISTANCE IS ..............";A4
170 INPUT"X COORDINATE";X
180 INPUT"Y COORDINATE";Y
190 W=(Y-ABS(A2))^2 + (X-ABS(A1))^2
200 A4=SQR(W)
210 A4=INT(A4*100+.5)/100
220 IF A4>=A THEN 120
230 A3=A3+A4-5
240 IF A3<=0 THEN 370
250 A0=A0-1
260 PRINT"GRAZE#";ABS(A0-5)
270 IF A0=0 THEN 70
280 GOTO 120
290 RD=(7^9*S*.00001)
300 S=RD-INT(RD)
310 D=-C+B*S
320 RETURN
330 RD=(7^9*S*.00001)
340 S=RD-INT(RD)
350 D=100*S
360 RETURN
370 PRINT:PRINT
380 PRINT TAB(10)"DIRECT HIT !!! SHIP SUNK."
390 PRINT TAB(10)"************************"
400 PRINT:PRINT
410 PRINT"WANT ANOTHER GAME?"
420 PRINT:PRINT"IF YES, ENTER <Y>; IF NO, ENTER <N>"
430 INPUT Z$
440 IF Z$="Y" OR Z$="y" THEN 20
450 PRINT"END OF THE GAME"
460 END
```

ONTBINDEN IN FAKTOREN Gerard van Roekel.

Kent u ze nog, die grote getallen welke eindeloos moesten worden gedeeld door 2, 3, 5, 9, 11 enz. Plots hield u dan 323 over en wat dan? Gelukkig hebben we daar een computer voor om dit op te lossen. Met het volgende simpele programma hebben we nooit meer problemen met 'ontbinden in faktoren'.

```
100 REM SCHOONMAKEN BEELDSCHERM
110 PRINT"ONTBINDEN IN FAKTOREN"
120 J=2
130 INPUT"WELK GETAL WILT U ONTBINDEN?";A$
140 A=VAL(A$):IFA<2ORINT(A)<>ATHEN100
150 FORI=JTOA
160 IFINT(A/I)=A/ITHENB=I:B$=B$+STR$(B):I=A
170 NEXT
180 A=A/B:J=B
190 IF A>=2 THEN 150
200 PRINTA$" BESTAAT UIT DE FAKTOREN:"
210 PRINTB$
220 INPUT"NOG EEN KEER? (J/N)";G$
230 IF G$="N" THEN END
240 IF G$<>"J" THEN 220
250 RUN
```

Junior tape save routines on the DOS65 computer.

Some time ago i started building a DOS65 computer and since i switched it on for the first time i have enjoyed working with it. Editing, assembling, loading and saving at tremendous speed with diskettesize up to 720k.
The only thing i couldn't do was loading and saving junior cassettes.
This is no big problem because with diskettedrives in your system there is no great need for an additional cassette recorder. Nevertheless i wanted to be as compatible with the junior system as possible, because my old junior is still standing in the corner for use as an eprom programmer.
This is why i have started adapting the junior cassette routines for use with the DOS65 (or EC65) computer. There is a pcb from Elektuur (EPS65028) with the hardware for a hobbyscope and a junior cassette interface. The following listing contains the modified junior save routines plus the routines used in book 3 to write testtapes plus two routines to check the 2400/3600 Hz output. If these frequencies are incorrect, they can be corrected by changing the values of variables higher and lower. The actual values are for my 1 MHz computer. I use timer 2 in 6522 nr 2 on the CPU piggyback board. The first part (label start) is a little program which shows how to use the routines.

```
                ; file          juncas.mac
                ;
                ; purpose       junior cassette interface for dos65 computer
                ;
                ; author        E.R.Elderenbosch
                ;               De Rijpgracht 49'''
                ;               1056 XS Amsterdam
                ;               tel. 020-125386
                ;
                ; date          110187  junior cassette write routines
                ;
                ;
                        lib     caslib.mac
                ;
                ;
00E0            sal     equ     $00e0
00E1            sah     equ     sal+$01
00E2            eal     equ     sal+$02
00E3            eah     equ     sal+$03
00E4            pointl  equ     sal+$04
00E5            pointh  equ     sal+$05
00E6            chkl    equ     sal+$06
00E7            chkh    equ     sal+$07
00E8            id      equ     sal+$08
00E9            syncnt  equ     sal+$09
00EA            bits    equ     sal+$0a
00EB            acc     equ     sal+$0b
00EC            count   equ     sal+$0c         ; 2 bytes
00EE            byte    equ     sal+$0e
00EF            char    equ     sal+$0f
00F0            sy      equ     sal+$10
00F1            higher  equ     sal+$11
00F2            lower   equ     sal+$12
00F3            first   equ     sal+$13
00F4            second  equ     sal+$14
                ;
E118            vbtbcl  equ     $e118           ; timer 2 latch low, counter low
E119            vbtbch  equ     $e119           ; timer 2 counter high
E11B            vbacr   equ     $e11b           ; auxiliary control register
E11D            vbifr   equ     $e11d           ; interrupt flag register
E280            juncas  equ     $e280           ; junior cassette port
                ;               bit 4 = output
                ;
                ;
0200                    org     $0200
                ;
0200 A0 00      start   ldy     #$00            ; dummy program to demonstrate
0202 84 E0              sty     sal             ;  how subroutines are used
0204 84 E2              sty     eal             ; save $2000 - $4000
0206 C8                 iny                     ;  with id = 01
0207 84 E8              sty     id              ; as junior tape format
0209 A9 20              lda     #$20
020B 85 E1              sta     sah
020D A9 40              lda     #$40
020F 85 E3              sta     eah
0211 20 0003            jsr     routine1
0214 60                 rts                     ; end of dummy prograr
                ;
0300                    org     $0300
                ;
```

```
                        ;       vector table
                        ;
0300 4C 0F03    routine1 jmp    dump            ; write memory area
0303 4C 4704    routine2 jmp    wrpatrn         ; write alternate ones & zeros
0306 4C 1D04    routine3 jmp    wrsyncs         ; write long sync leader
0309 4C 7C04    routine4 jmp    testhi          ; write 3600 Hz continuously
030C 4C 8C04    routine5 jmp    testlo          ; write 2400 Hz continuously
                        ;
030F A9 6C      dump    lda     #$6c
0311 85 F1              sta     higher
0313 A9 B0              lda     #$b0
0315 85 F2              sta     lower
0317 A9 03              lda     #$03
0319 85 F3              sta     first
031B A9 02              lda     #$02
031D 85 F4              sta     second
                        ;
031F 78         dumpt   sei
0320 A0 00              ldy     #$00
0322 8C 1BE1            sty     vbacr           ; set timer 2 in oneshot mode
0325 84 EB              sty     acc
0327 84 E6              sty     chkl            ; reset checksum
0329 84 E7              sty     chkh
032B C8                 iny
032C 8C 19E1            sty     vbtbch          ; activate timer 2 initially
032F A5 E0              lda     sal             ; initialize dumpt pointer
0331 85 E4              sta     pointl
0333 A5 E1              lda     sah
0335 85 E5              sta     pointh
0337 A2 FF              ldx     #$ff            ; set sync counter
0339 86 E9              stx     syncnt
                        ;
033B A9 16      syncs   lda     #$16            ; syn character
033D 20 B403            jsr     outch           ; output 255 syn characters
0340 C6 E9              dec     syncnt
0342 D0 F7              bne     syncs
                        ;
0344 A9 2A              lda     #'*             ; output start character
0346 20 B403            jsr     outch
0349 A5 E8              lda     id              ; output id
034B 20 9C03            jsr     outbt
034E A5 E0              lda     sal             ; output start address
0350 20 8F03            jsr     outbtc          ; and start checksum computation
0353 A5 E1              lda     sah
0355 20 8F03            jsr     outbtc
                        ;
0358 A5 E5      datatr  lda     pointh
035A C5 E3              cmp     eah             ; entire file transmitted?
035C D0 21              bne     hexdat
035E A5 E4              lda     pointl
0360 C5 E2              cmp     eal
0362 D0 1B              bne     hexdat
                        ;
0364 A9 2F              lda     #'/             ; output end of data character
0366 20 B403            jsr     outch           ; stop with check sum computation
0369 A5 E6              lda     chkl            ; output checksum
036B 20 9C03            jsr     outbt
036E A5 E7              lda     chkh
0370 20 9C03            jsr     outbt
0373 A9 04              lda     #$04            ; eot character
0375 20 B403            jsr     outch           ; output eot character
0378 A9 04              lda     #$04            ; eot character
037A 20 B403            jsr     outch
037D 58                 cli                     ; enable keyboard & clock again
037E 60                 rts
                        ;
037F A0 00      hexdat  ldy     #$00
0381 B1 E4              lda     [pointl],y      ; fetch current data byte
0383 20 8F03            jsr     outbtc          ; transmit current data byte
0386 E6 E4              inc     pointl          ; and compute checksum
0388 D0 CE              bne     datatr          ; setup for next data byte
038A E6 E5              inc     pointh
038C 4C 5803            jmp     datatr
                        ;
038F A8         outbtc  tay                     ; save accu
0390 18                 clc
0391 65 E6              adc     chkl            ; checksum computation
0393 85 E6              sta     chkl
0395 A5 E7              lda     chkh
0397 69 00              adc     #$00            ; chk := chk + byte
0399 85 E7              sta     chkh
039B 98                 tya                     ; get accu again
039C A8         outbt   tay                     ; save accu temp
039D 4A                 lsra                    ; get upper nibble
039E 4A                 lsra
```

```
039F 4A                 lsra
03A0 4A                 lsra
03A1 20 AB03            jsr     nibout          ; output upper nibble as ascii char.
03A4 98                 tya                     ; get byte again
03A5 29 0F              and     #$0f            ; get lower nibble
03A7 20 AB03            jsr     nibout          ; output lower nibble as ascii char.
03AA 60                 rts
                ;
03AB C9 0A      nibout  cmp     #$0a            ; convert a nibble to an ascii char.
03AD 18                 clc
03AE 30 02              bmi     nib
03B0 69 07              adc     #$07
03B2 69 30      nib     adc     #$30
03B4 A2 08      outch   ldx     #$08            ; set up for 8 bits
03B6 86 EA              stx     bits
03B8 4A         one     lsra                    ; shift out bit by bit
03B9 48                 pha                     ; save character
03BA 90 0C              bcc     zero
03BC 20 D703            jsr     high            ; start at 3600 Hz
03BF 20 FA03            jsr     low
03C2 20 FA03            jsr     low             ; end at 2400 Hz
03C5 4C D103            jmp     zro
03C8 20 D703    zero    jsr     high            ; start at 3600 Hz
03CB 20 D703            jsr     high
03CE 20 FA03            jsr     low             ; end at 2400 Hz
03D1 68         zro     pla                     ; get character again
03D2 C6 EA              dec     bits            ; all bits shifted out?
03D4 D0 E2              bne     one
03D6 60                 rts
                ;
03D7 A6 F3      high    ldx     first           ; three half periods of 3600 Hz
03D9 A9 20      loop1   lda     #%00100000      ; get mask for timer 2 interrupt flag
03DB 2C 1DE1    2       bit     vbifr           ; timer 2 flag set?
03DE F0 FB              beq     2.              ; no, interval not completed
03E0 AD 18E1            lda     vbtbcl          ; clear interrupt flag
03E3 A5 EB              lda     acc
03E5 49 10              eor     #%00010000      ; 1 = bit to be toggled
03E7 85 EB              sta     acc
03E9 8D 80E2            sta     juncas
03EC A5 F1              lda     higher          ; 3600 Hz half cycle time
03EE 8D 18E1            sta     vbtbcl          ; timer 2 low
03F1 A9 00              lda     #$00
03F3 8D 19E1            sta     vbtbch          ; start timing of timer 2
03F6 CA                 dex
03F7 D0 E0              bne     loop1
03F9 60                 rts
                ;
03FA A6 F4      low     ldx     second          ; two half periods of 2400 Hz
03FC A9 20      loop2   lda     #%00100000      ; get mask for timer 2 int. flag
03FE 2C 1DE1    1       bit     vbifr           ; timer 2 flag set?
0401 F0 FB              beq     1.              ; no, interval not completed
0403 AD 18E1            lda     vbtbcl          ; clear interrupt flag
0406 A5 EB              lda     acc
0408 49 10              eor     #%00010000      ; 1 = bit to be toggled
040A 85 EB              sta     acc
040C 8D 80E2            sta     juncas
040F A5 F2              lda     lower           ; 2400 Hz half cycle time
0411 8D 18E1            sta     vbtbcl          ; timer 2 low
0414 A9 00              lda     #$00
0416 8D 19E1            sta     vbtbch          ; start timing of timer 2
0419 CA                 dex
041A D0 E0              bne     loop2
041C 60                 rts
                ;
                ; the following routines are for test purposes only
                ; and are adapted from junior book 3 routines.
                ;
041D 78         wrsyncs sei                     ; write four minutes of syncs
041E A9 00              lda     #$00
0420 8D 1BE1            sta     vbacr
0423 A9 01              lda     #$01
0425 8D 19E1            sta     vbtbch
0428 A9 A0              lda     #$a0            ; (00 for eleven minutes)
042A 85 EC              sta     count
042C 85 ED              sta     count+1
042E 18         1       clc
042F A9 01              lda     #$01
0431 65 EC              adc     count
0433 85 EC              sta     count
0435 A9 00              lda     #$00
```

```
0437 65 ED              adc     count+1
0439 85 ED              sta     count+1
043B B0 08              bcs     wrend
043D A9 16              lda     #$16            ; sync character
043F 20 B403            jsr     outch           ; output to tape
0442 4C 2E04            jmp     1.
0445 58         wrend   cli
0446 60                 rts
                ;
0447 78         wrpatrn sei                     ; write a few minutes alternate ones & z
0448 A9 00              lda     #$00
044A 8D 1BE1            sta     vbacr
044D A9 01              lda     #$01
044F 8D 19E1            sta     vbtbch
0452 A9 00              lda     #$00
0454 85 EC              sta     count
0456 85 ED              sta     count+1
0458 18         2       clc
0459 A9 01              lda     #$01
045B 65 EC              adc     count
045D 85 EC              sta     count
045F A9 00              lda     #$00
0461 65 ED              adc     count+1
0463 85 ED              sta     count+1
0465 B0 DE              bcs     wrend
0467 20 D703            jsr     high
046A 20 FA03            jsr     low
046D 20 FA03            jsr     low
0470 20 D703            jsr     high
0473 20 D703            jsr     high
0476 20 FA03            jsr     low
0479 4C 9604            jmp     2.
                ;
                ; the following routines are usefull for measuring the
                ; 2400 & 3600 Hz frequencies. (adjust with higher & lower)
                ;
047C 78         testhi  sei
047D A0 00              ldy     #$00
047F 8C 1BE1            sty     vbacr           ; set timer 2 oneshot
0482 C8                 iny
0483 8C 19E1            sty     vbtbch          ; start timer initially
0486 20 D703    1       jsr     high
0489 4C 8604            jmp     1.
                ;
048C 78         testlo  sei
048D A0 00              ldy     #$00
048F 8C 1BE1            sty     vbacr           ; set timer 2 oneshot
0492 C8                 iny
0493 8C 19E1            sty     vbtbch          ; start timer initially
0496 20 FA03    2       jsr     low
0499 4C 9604            jmp     2.
                ;
          0200          end     start
```

Junior tape load routines on the DOS65 computer.
==========

Like with the tape save routines i have tried to make as few changes as possible to the original junior routines so that the old routines can be easily exchanged for the new ones. There are a few changes that had to be made however, because there is no hex display on the DOS65 computer. I have connected three leds to the outputs of three inverters (7406). The inputs of the inverters are connected to the 74173 (IC 4) in the following way :

red   led - pin2 7406 pin1 - print hole marked S6.
orange led - pin4 7406 pin3 - print hole marked S7.
green led - pin6 7406 pin5 - print hole marked S8.
three resistors of 470 ohm from the leds to the +5V.

When the program is started, the leds are off. As soon as one bit is received, the red led comes on, indicating that the the program is searching for syncs. When syncs are found, the orange led comes on. If you have a bad tape, the red led comes on again. If the start character is found, the green led is lit. After the data is loaded, the leds are off again. If you cannot read the tape, you have to re-boot the system because control-C doesn't work during running of the load routines. This is necessary for the timing. Just like in the save routines, i use timer 2 of the second 6522 on the cpu board. This change is also necessary because there is no 6532 in the standard system. Instead of one timer in the original program, clocked by the system clock/64, i have used both high and low parts of timer 2, clocked by the system clock. After having detected a change in inputsignal, i only check the high byte of the timer. This should be sufficient. Good luck!

==========

```
                        ; file          junread.mac
                        ;
                        ; purpose       junior cassette interface for dos65 computer
                        ;
                        ; author        E.R.Elderenbosch
                        ;
                        ; date          220137  cassette junior read routines
                        ;
                        ;
                                lib     caslib.mac
                        ;
                        ;
            00E0        sal     equ     $00e0
            00E1        sah     equ     sal+$01
            00E2        eal     equ     sal+$02
            00E3        eah     equ     sal+$03
            00E4        pointl  equ     sal+$04
            00E5        pointh  equ     sal+$05
            00E6        chkl    equ     sal+$06
            00E7        chkh    equ     sal+$07
            00E8        id      equ     sal+$08
            00E9        syncnt  equ     sal+$09
            00EA        bits    equ     sal+$0a
            00EB        acc     equ     sal+$0b
            00EC        count   equ     sal+$0c         ; 2 bytes
            00EE        byte    equ     sal+$0e
            00EF        char    equ     sal+$0f
            00F0        sy      equ     sal+$10
            00F1        higher  equ     sal+$11
            00F2        lower   equ     sal+$12
            00F3        first   equ     sal+$13
            00F4        second  equ     sal+$14
            00B0        timelo  equ     $00b0
            006C        timehi  equ     $006c
                        ;
            E118        vbtbcl  equ     $e118           ; timer 2 latch low, counter low
            E119        vbtbch  equ     $e119           ; timer 2 counter high
            E11B        vbacr   equ     $e11b           ; auxiliary control register
            E11D        vbifr   equ     $e11d           ; interrupt flag register
                        ;
            E280        juncas  equ     $e280           ; junior cassette port
                        ;               bit 4 = output
                        ;               bit 0 = input
                        ;
            0200                org     $0200
                        ;
                        ;
0200 A9 00              start   lda     #$00            ; dummy program to load
0202 85 E0                      sta     sal             ; to $2000 upwards
0204 A9 20                      lda     #$20            ; in memory
0206 85 E1                      sta     sah
0208 A9 FF                      lda     #$ff            ; set tape id = ff
020A 85 E8                      sta     id
020C 20 1002                    jsr     rdtape          ; start reading tape
020F 60                         rts                     ; end of dummy program
                        ;
0210 78                 rdtape  sei
0211 20 5003                    jsr     noled           ; turn leds off
0214 A9 00                      lda     #$00
0216 8D 1BE1                    sta     vbacr           ; set timer 2 oneshot
0219 85 E6                      sta     chkl
021B 85 E7                      sta     chkh
021D A9 FF              sync    lda     #$ff            ; reset for syn character
021F 85 EF                      sta     char
0221 20 BC02            synca   jsr     rdbit           ; read a bit from tape
0224 66 EF                      ror     char            ; right shift
0226 A5 EF                      lda     char            ; get current character
0228 20 5603                    jsr     searled         ; display searching (red led)
022B C9 16                      cmp     #$16            ; syn character?
022D D0 F2                      bne     synca           ; if not, resync
022F A0 0A                      ldy     #$0a            ; try it for 10 syncs at least
0231 84 F0                      sty     sy              ; sync counter
0233 20 3103            tensyn  jsr     rdch
0236 20 5003                    jsr     syncled         ; display syn character (orange led)
0239 C9 16                      cmp     #$16            ; still sync character?
023B D0 E0                      bne     sync            ; if not, return
023D C6 F0                      dec     sy              ; 10 syncs received?
023F D0 F2                      bne     tensyn          ; return if less than 10 syncs
0241 20 3103            star    jsr     rdch            ; wait for '*' character
0244 20 5003                    jsr     syncled         ; display syn character (orange led)
```

```
0247 C9 2A          cmp   #'*
0249 F0 06          beq   stara
024B C9 16          cmp   #$16          ; still sync character?
024D F0 F2          beq   star          ; if yes, then wait
024F D0 BF          bne   rdtape        ; if not, then resync
0251 20 6203  stara jsr   dataled       ; display data (green led)
0254 20 F002        jsr   rdbyt         ; read id from tape
0257 C5 E8          cmp   id            ; requested id?
0259 D0 40          bne   chkid
025B 20 F002  rdsa  jsr   rdbyt         ; read sal from tape
025E 20 4203        jsr   chksum        ; checksum computation
0261 85 E4          sta   pointl        ; setup store pointer
0263 20 F002        jsr   rdbyt         ; read sah from tape
0266 20 4203        jsr   chksum
0269 85 E5          sta   pointh
026B 20 F002  filmem jsr  rdbyt         ; read data byte from tape
026E 30 A0          bmi   rdtape        ; not valid hex character
0270 F0 13          beq   check         ; end of data character?
0272 20 4203        jsr   chksum
0275 A0 00          ldy   #$00
0277 91 E4          sta   [pointl],y    ; store byte in memory
0279 E6 E4          inc   pointl        ; set pointer for next byte
027B D0 02          bne   fma
027D E6 E5          inc   pointh
027F 20 6203  fma   jsr   dataled       ; display data (green led)
0282 4C 6B02        jmp   filmem        ; read next data byte from tape
0285 20 F002  check jsr   rdbyt         ; read checksum from tape
0288 C5 E6          cmp   chkl          ; and compare it
028A D0 0C          bne   synvec
028C 20 F002        jsr   rdbyt
028F C5 E7          cmp   chkh
0291 D0 05          bne   synvec
0293 20 5003        jsr   noled         ; turn leds off
0296 58             cli
0297 60             rts                 ; return to caller
0298 4C 1002  synvec jmp  rdtape
029B A5 E8    chkid lda   id
029D C9 00          cmp   #$00          ; id = 00?
029F F0 BA          beq   rdsa
02A1 C9 FF          cmp   #$ff          ; id = ff?
02A3 D0 F3          bne   synvec
02A5 20 F002        jsr   rdbyt         ; read sa from tape, but ignore it
02A8 20 4203        jsr   chksum
02AB 20 F002        jsr   rdbyt
02AE 20 4203        jsr   chksum
02B1 A5 E0          lda   sal           ; use sa stored in buffer
02B3 85 E4          sta   pointl
02B5 A5 E1          lda   sah
02B7 85 E5          sta   pointh
02B9 4C 6B02        jmp   filmem
                ;
02BC A9 01    rdbit lda   #%00000001
02BE 2C 80E2  1     bit   juncas        ; 3600 Hz?
02C1 D0 FB          bne   1.
02C3 AD 19E1        lda   vbtbch        ; load timer 2 high byte
02C6 85 EB          sta   acc
02C8 A0 FF          ldy   #$ff          ; initial timer value $ffff
02CA 8C 18E1        sty   vbtbcl        ; store timer 2 low
02CD 8C 19E1        sty   vbtbch        ; store timer 2 high & start timing
02D0 A0 14          ldy   #$14          ; jitter time
02D2 88       rdba  dey                 ; delay jitter time
02D3 D0 FD          bne   rdba
02D5 A9 01    rdbb  lda   #%00000001
02D7 2C 80E2  2     bit   juncas        ; 2400 Hz?
02DA F0 FB          beq   2.
02DC 38             sec
02DD A5 EB          lda   acc
02DF ED 19E1        sbc   vbtbch        ; set or reset c-flag
02E2 A0 FF          ldy   #$ff
02E4 8C 18E1        sty   vbtbcl
02E7 8C 19E1        sty   vbtbch
02EA A0 07          ldy   #$07          ; delay for jitter
02EC 88       rdbc  dey
02ED D0 FD          bne   rdbc
02EF 60             rts
                ;
02F0 20 3103  rdbyt jsr   rdch          ; read any ascii character from tape
02F3 C9 2F          cmp   #'/           ; end of data character?
02F5 D0 01          bne   rbb
02F7 60       rba   rts                 ; error exit
02F8 20 1403  rbb   jsr   aschex        ; ascii hex conversion
02FB 30 FA          bmi   rba           ; not valid character
02FD 0A             asla                ; shift nibble to left
```

```
02FE 0A                 asla
02FF 0A                 asla
0300 0A                 asla
0301 85 EE              sta     byte            ; save high order nibble
0303 20 3103            jsr     rdch            ; read next character
0306 C9 2F              cmp     #'/             ; end of data character
0308 F0 ED              beq     rba
030A 20 1403            jsr     aschex          ; ascii hex conversion
030D 30 E8              bmi     rba             ; not valid character
030F 05 EE              ora     byte            ; byte = high order and low order nibble
0311 A0 01              ldy     #$01            ; be shure that character
0313 60                 rts                     ; normal exit
                ;
0314 C9 30      aschex  cmp     #$30            ; ignore 00...2f
0316 30 0C              bmi     notval
0318 C9 3A              cmp     #$3a
031A 30 0B              bmi     valid
031C C9 41              cmp     #$41            ; ignore 3a...40
031E 30 04              bmi     notval
0320 C9 47              cmp     #$47            ; ignore 47...7f
0322 30 03              bmi     valid
0324 A0 FF      notval  ldy     #$ff            ; set n-flag
0326 60                 rts                     ; error exit
0327 C9 40      valid   cmp     #$40            ; ascii hex conversion
0329 30 03              bmi     val
032B 18                 clc
032C 69 09              adc     #$09
032E 29 0F      val     and     #$0f            ; hex data is low order nibble in accu
0330 60                 rts
                ;
0331 A2 08      rdch    ldx     #$08            ; set up for 8 bits
0333 20 BC02    read    jsr     rdbit           ; read a bit from tape
0336 66 EF              ror     char            ; shift bit into character
0338 CA                 dex                     ; all bits read?
0339 D0 F8              bne     read
033B 26 EF              rol     char            ; b7 must be zero
033D 46 EF              lsr     char
033F A5 EF              lda     char            ; received character to accu
0341 60                 rts
                ;
0342 48         chksum  pha                     ; save accu
0343 18                 clc
0344 65 E6              adc     chkl            ; chk := chk + byte
0346 85 E6              sta     chkl
0348 A5 E7              lda     chkh
034A 69 00              adc     #$00
034C 85 E7              sta     chkh
034E 68                 pla                     ; get accu again
034F 60                 rts
                ;
0350 A0 00      noled   ldy     #$00
0352 8C 80E2            sty     juncas
0355 60                 rts
                ;
0356 A0 20      searled ldy     #$20
0358 8C 80E2            sty     juncas
035B 60                 rts
                ;
035C A0 40      syncled ldy     #$40
035E 8C 80E2            sty     juncas
0361 60                 rts
                ;
0362 A0 80      dataled ldy     #$80
0364 8C 80E2            sty     juncas
0367 60                 rts
                ;
          0200          end     start
                                label table
```

```
0 LIST
SCR # 0
  0 ****************  FIG-FORTH MODEL  ******************************
  1
  2                   THROUGH THE COURTESY OF
  3
  4                    FORTH INTEREST GROUP
  5                       P. O. BOX 1105
  6                    SAN CARLOS. CA. 94070
  7
  8                          RELEASE V1.1
  9              COMPILER SECURITY & VARIABLE LENGTH NAMES
 10
 11        FURTHER DISTRIBUTION MUST INCLUDE THE ABOVE NOTICE
 12
 13                   REDAKTIE "DE 6502 KENNER"
 14                   JACOB JORDAENSSTRAAT 15
 15                   2923 CK KRIMPEN A.D. IJSSEL.
OK
6 LIST
SCR # 6
  0 ( FIG-FORTH DECOMPILER )
  1 ( CASE CONTROL STATEMENT BY CHARLES E. EAKER )
  2 ( PUBLISHED IN FORTH DIMENSIONS II/3 PAGE 37 )
  3 FORTH DEFINITIONS DECIMAL
  4 : CASE             ?COMP CSP @ !CSP 4 : IMMEDIATE
  5 : OF               4 ?PAIRS
  6                    COMPILE OVER COMPILE =
  7                    COMPILE OBRANCH HERE 0 ,
  8                    COMPILE DROP 5 : IMMEDIATE
  9 : ENDOF            5 ?PAIRS
 10                    COMPILE BRANCH HERE 0 ,
 11                    SWAP 2 [COMPILE] ENDIF 4 : IMMEDIATE
 12 : ENDCASE         4 ?PAIRS COMPILE DROP
 13                    BEGIN SP@ CSP @ = 0=
 14                    WHILE 2 [COMPILE] ENDIF REPEAT
 15                    CSP ! : IMMEDIATE                --)
OK
7 LIST
SCR # 7
  0 ( FIG-FORTH DECOMPILER )
  1 0 VARIABLE QUIT.FLAG     0 VARIABLE WORD.PTR
  2 ( FIND RUN-TIME ADDRESSES OF EACH VOCABULARY WORD TYPE )
  3 ' (LOOP)           2 - CONSTANT     LOOP.ADR
  4 ' LIT              2 - CONSTANT     LIT.ADR
  5 ' :                2 - @ CONSTANT   DOCOL.ADR
  6 ' OBRANCH          2 - CONSTANT     OBRANCH.ADR
  7 ' BRANCH           2 - CONSTANT     BRANCH.ADR
  8 ' (+LOOP)          2 - CONSTANT     PLOOP.ADR
  9 ' (.")             2 - CONSTANT     PDOTQ.ADR
 10 ' C/L              2 - @ CONSTANT   CONST.ADR
 11 ' BASE             2 - @ CONSTANT   USERV.ADR
 12 ' USE              2 - @ CONSTANT   VAR.ADR
 13 ' (:CODE)          2 - CONSTANT     PSCODE.ADR
 14 --)
 15
OK
8 LIST
SCR # 8
  0 ( FIG-FORTH DECOMPILER )
  1
  2 : N.               ( PRINT A NUMBER IN DECIMAL AND HEX )
  3                    DUP DECIMAL . SPACE
  4                    HEX 0  ." ( "  D.  ." H ) "   DECIMAL :
  5
  6 : PDOTQ.DSP        ( DISPLAY A COMPILED TEXT STRING )
  7                    WORD.PTR @ 2+ DUP )R DUP
  8                    C@ + 1 - WORD.PTR ! ( UPDATE PFA POINTER )
  9                    R) COUNT TYPE :
 10
 11 : WORD.DSP         ( GIVEN CFA. DISPLAY THE GLOSSARY NAME )
 12                    3 - -1 TRAVERSE DUP 1+ C@ 59 =
 13                    IF 1 QUIT.FLAG ! ENDIF ( IF ":" WE ARE DONE )
 14                    DUP C@ 160 AND 128 =  ( MAKE SURE LEGAL NFA )
 15                    IF ID. ELSE 1 QUIT.FLAG ! ENDIF :        --)
OK
```

```
 9 LIST
 SCR # 9
   0 ( FIG-FORTH DECOMPILER )
   1
   2 : BRANCH.DSP      ( GET BRANCH OFFSET. CALCULATE THE )
   3                   ( ACTUAL BRANCH ADDRESS. AND DISPLAY IT )
   4                   ." TO "
   5                   WORD.PTR @ 2+ DUP WORD.PTR ! ( UPDATE PFA PTR )
   6                   DUP @ +    ( OFFSET + PFA = ACTUAL TARGET ADDR )
   7                   0 HEX D. DECIMAL ( PRINT IT )    ;
   8
   9 : USERV.DSP       ( DISPLAY A USER VARIABLE )
  10                   ." USER VARIABLE. CURRENT VALUE = "
  11                   WORD.PTR @ 2+   ( CALCULATE PFA )
  12                   C@ 38 +ORIGIN @ +   ( THEN USER AREA ADDRESS )
  13                   @ N.   ( FETCH AND PRINT CONTENTS )
  14                   1 QUIT.FLAG ! ( DONE. SET FLAG )   ;
  15 --)
 OK
 10 LIST
 SCR # 10
   0 ( FIG-FORTH DECOMPILER )
   1
   2 : VAR.DSP         ( DISPLAY A VARIABLE )
   3                   ." VARIABLE. CURRENT VALUE = "
   4                   WORD.PTR @ 2+   ( CALCULATE PFA )
   5                   @ N.      ( FETCH AND PRINT CONTENTS )
   6                   1 QUIT.FLAG ! ( ALL DONE. SET FLAG )   ;
   7
   8 : CONST.DSP       ( DISPLAY A COMPILED CONSTANT )
   9                   ." CONSTANT. VALUE = "
  10                   WORD.PTR @ 2+ ( CALCULATE PFA )
  11                   @ N.      ( FETCH AND PRINT CONTENTS )
  12                   1 QUIT.FLAG ! ( ALL DONE. SET FLAG )   ;
  13 --)
  14
  15
 OK
 11 LIST
 SCR # 11
   0 ( FIG-FORTH DECOMPILER )
   1 : DIS
   2   -FIND 0=            ( IS INPUT WORD IN DICTIONARY? )
   3   IF 3 SPACES ." ? NOT IN GLOSSARY " CR      ( NO. QUIT )
   4   ELSE DROP DUP DUP 2 -    ( YES. CALCULATE CFA )
   5   @ =      ( IF CONTENTS OF CFA = PFA THEN IT IS A PRIMITIVE )
   6   IF ." (PRIMITIVE) " CR      ( SO PRINT MESSAGE AND QUIT )
   7   ELSE    ( OTHERWISE IT'S HIGH LEVEL FORTH SO DECODE IT )
   8   0 QUIT.FLAG !      ( INITIALIZE DONE FLAG )
   9   2 - WORD.PTR !     ( INITIALIZE PSEUDOCODE POINTER )
  10   CR CR              ( PRINT SOME BLANK LINES )
  11   BEGIN              ( NOW LIST THE COMPILED PSEUDOCODE )
  12   WORD.PTR @ DUP     ( FETCH CURRENT PSEUDOCODE POINTER )
  13   0 HEX D. SPACE DECIMAL ( PRINT VALUE OF POINTER )
  14   @                  ( FETCH CURRENT PSEUDOCODE WORD )
  15 --)
 OK
 12 LIST
 SCR # 12
   0 ( FIG-FORTH DECOMPILER )
   1 CASE              ( NOW DECODE ANY SPECIAL WORD TYPES )
   2 LIT.ADR OF        ( COMPILED LITERAL. PRINT ITS VALUE )
   3                   WORD.PTR @ 2+ DUP WORD.PTR ! @ N. ENDOF
   4 DOCOL.ADR OF      ( : POINTS TO THE NESTING ROUTINE )
   5                   ." : "     ENDOF     ( SO JUST PRINT A COLON )
   6 0BRANCH.ADR OF    ( CONDITIONAL BRANCH WITH IN-LINE OFFSET )
   7                   ." BRANCH IF ZERO "     BRANCH.DSP ENDOF
   8 BRANCH.ADR OF     ( UNCONDITIONAL BRANCH WITH IN-LINE OFFSET )
   9                   ." BRANCH "     BRANCH.DSP ENDOF
  10 LOOP.ADR OF       ( END OF A DO...LOOP STRUCTURE )
  11                   ." LOOP "     BRANCH.DSP ENDOF
  12 PLOOP.ADR OF      ( END OF A DO...+LOOP STRUCTURE )
  13                   ." +LOOP "    BRANCH.DSP ENDOF
  14 --)
  15
 OK
```

```
13 LIST
SCR # 13
  0 ( FIG-FORTH DECOMPILER )
  1 PDOTQ.ADR OF     ( DISPLAY COMPILE TEXT STRING )
  2                  ." PRINT TEXT: "   PDOTQ.DSP ENDOF
  3 USERV.ADR OF     ( DISPLAY A USER VARIABLE )
  4                  USERV.DSP ENDOF
  5 VAR.ADR OF       ( DISPLAY A GLOBAL VARIABLE )
  6                  VAR.DSP ENDOF
  7 CONST.ADR OF     ( DISPLAY A COMPILED CONSTANT )
  8                  CONST.DSP ENDOF
  9 PSCODE.ADR OF    ( DISPLAY :CODE AND QUIT )
 10                  WORD.PTR @ @ WORD.DSP
 11                  1 QUIT.FLAG ! ENDOF
 12 --)
 13
 14
 15
OK
14 LIST
SCR # 14
  0 ( FIG-FORTH DECOMPILER )
  1
  2                           ( ALL SPECIAL WORD TYPES CHECKED. )
  3 DUP WORD.DSP              ( IF WORD DID NOT MATCH ANY CASES )
  4                           ( JUST PRINT ITS NAME )
  5 ENDCASE CR                ( DONE DECODING WORD TYPE )
  6 2 WORD.PTR +!             ( UPDATE PSEUDOCODE POINTER )
  7 QUIT.FLAG @               ( CHECK IF FINISHED FLAG SET OR IF )
  8 ?TERMINAL OR              ( INTERRUPTION FROM THE TERMINAL )
  9 UNTIL                     ( OTHERWISE DISPLAY ANOTHER WORD )
 10 ENDIF ENDIF CR :          ( ALL DONE NOW )
 11
 12
 13
 14
 15
OK
15 LIST
SCR # 15
  0 ( FIG-FORTH DECOMPILER )
  1
  2 NFA   = NAME FIELD ADDRESS
  3 CFA   = CODE FIELD ADDRESS
  4 PFA   = PARAMETER FIELD ADDRESS
  5
  6       EXAMPLES :
  7
  8       DIS XXX       ? NOT IN GLOSSARY
  9
 10       DIS C/L       CONSTANT. VALUE = 64   ( 40 H )
 11
 12       DIS DUP       (PRIMITIVE)
 13
 14                                        GOOD LUCK !
 15
OK
```

```
10REM ****************************************
20REM *** REKENING 09 MSX / 06 april 1987 ***
30REM ****************************************
40REM *** Peter Grinwis & Simon Voortman  ***
50REM *** Beatrixweg 28  3253 BB OUDDORP  ***
60REM ****************************************
70REM *** Made on Acorn Electron 64k with ***
80REM ***       MSX or STAR printer       ***
90REM ****************************************
100
110MODE0:DIM DATE$(21),OMSCHR$(21),BEDRAG$(21):@%=&90A:data%=0:T%=0:p%=0
120VDU23,133,8,4,62,6,62,102,62,0:REM Define an 'a' with \ on it for MSX or
130VDU23,193,8,4,62,6,62,102,62,0:REM for STAR (on screen only)
140A%=0:B%=0:C%=0:D%=0:Z=0:B1=6:Bh=20:naam$="":adres$="":place$="":REK%=0
150REPEAT:A%=A%+1:DATE$(A%)="":OMSCHR$(A%)="":BEDRAG$(A%)="":UNTIL A%=21
160REM ********************************
170REM * Create strings for heading *
180REM ********************************
190F$=CHR$17:ION$=F$+CHR$0+F$+CHR$129:REM Inverse video on
200IOF$=F$+CHR$1+F$+CHR$128:REM Inverse video off
210R$="R E K E N I N G E N"
220VERKOPER$="JAN GRINWIS Pzn":BEDRIJF$="Gewasbeschermingsbedrijf"
230ADRES$="Weststraat 41":ADRES2$="3253 AR Ouddorp Z.H.":BANK$="Bank: Rabo"
240TELF$="Telef. 01878-1686":NR$="No. ----.--.---":GIRO$="Giro -------"
250REGKvK$="Reg.no. K.v.K. ------":REGL$="Reg.no. -. -------- -"
260W1$="hand- en machinewerk":W2$="rijenbespuiting":W3$="kapbespuiting"
270W4$="wegenbespuiting":W5$="erfbespuiting":W6$="watergangen"
280W7$="dijken en weilanden":W8$="gazons":W9$="enz."
290
300PRINTTAB(30,1)R$
310PRINTTAB(23,2);ION$"P R I N T E R  I N S T E L L I N G";IOF$
320PRINT''"PRINTER aangesloten (J/N): ";:c%=GET AND&DF
330IF (c%=74) OR (c%=89) PRINT"Ja":c%=1 ELSE PRINT"Nee":c%=0:GOTO 390
340PRINT''"Is het MSX  (1)"'SPC4"of STAR (2): ";:T%=GET-48:IF T%<>1 T%=2
350IF T%=2 PRINT"STAR" ELSE PRINT"MSX"
360PRINT'"Papier lengte 11 inch (1)"'SPC11"of 12 inch (2): ";
370REPEAT:L%=GET-48:UNTIL L%=1 OR L%=2
380IF L%=1 PRINT"11 inch" ELSE PRINT"12 inch"
390d%=INKEY(200):REM Wait 2 seconds
400
410REM MENU
420REPEAT:CLS:X%=37:PRINT'TAB(X%-7);R$
430PRINTTAB(X%,4);ION$;SPC6;TAB(X%,5);" MENU ";TAB(X%,6);SPC6;IOF$;'''
440RESTORE530:READ D%
450FOR ch%=1 TO D%:READ CH$:PRINT'TAB(X%-5);ION$;ch%;IOF$;". ";CH$:NEXT
460PRINT'''TAB(X%-3)"Uw keuze...";
470REPEAT:ch%=GET-48:UNTIL ch%>0 AND ch%<=D%
480IF ch%=1 PROCinput
490IF ch%=2 PROCprint
500IF ch%=3 PROCold_data
510UNTIL ch%=4:CLS:END
520
530DATA 4,Nieuwe rekening,Printen,Oude data,Stoppen
540
550DEFPROCinput:CLS:A%=0:B%=0:C%=0:D%=0:Z=0:B1=6:Bh=20
560naam$="":adres$="":place$="":datum$="":REK%=0
570PRINTTAB(3,3)"REKENINGEN":@%=&90A
580INPUT''"Rekening voor "naam$
590INPUT"Adres "adres$
600INPUT"Plaats "place$
610INPUT"Datum "datum$
620INPUT"Rekening "REK%
630INPUT"Btw (bv. 20 ) % "BTW$
640INPUT"Korting J/N ";K$:ko=FALSE
650IF INSTR("Jj",K$) THEN ko=TRUE:INPUT"Hoeveel korting (bv. 5 ) % "kort$
660INPUT"Verkoop (V) of gewerkt (G)";:vg=GET AND&DF:vg$=CHR$(vg):a$=" a f "
670IF vg$="V" THEN VK=TRUE ELSE VK=FALSE
```

```
680IF TX=2 THEN a$=" "+CHR$193+" f " ELSE IF TX=1 THEN a$=" "+CHR$133+" f "
690CLS:PRINT''"(RETURN) bij datum -) Terug naar menu"'':AX=0
700REPEAT:AX=AX+1:DATE$(AX)="":OMSCHR$(AX)="":BEDRAG$(AX)="0"
710PRINT;AX;:INPUT" Datum "DATE$(AX)
720IF DATE$(AX)="" THEN GOTO 810
730IF NOT VK THEN 760
740INPUTSPC(3)"Aantal "numX
750INPUTLINESPC(3)"Omschrijving "omschr$
760IF NOT VK THEN INPUTLINESPC(3)"Omschrijving "OMSCHR$(AX)
770IF NOT VK THEN INPUTLINESPC(3)"Bedrag "BEDRAG$(AX):GOTO 810
780INPUTLINESPC(3)"Bedrag per stuk "bedrag$
790bedrag=VAL(bedrag$):nbedr=bedrag*numX:BEDRAG$(AX)=STR$(nbedr)
800OMSCHR$(AX)=STR$(numX)+"x "+omschr$+a$+bedrag$
810UNTIL DATE$(AX)="":AX=AX-1:N_ART=AX:dataX=1
820IF N_ART<10 THEN REPEAT:AX=AX+1:DATE$(AX)="..-..":OMSCHR$(AX)=STRING$(54,"."):BEDRAG$="0":UNTIL AX=10
830ENDPROC
840
850DEFPROCprint:CLS:IF dataX<>1 PRINTTAB(31,16)"Geen data aanwezig"''TAB(30)"Druk op een toets...":dX=GET:ENDPROC
860IF cX=0 VDU3:GOTO 950:REM No printer connected, so no printed output
870PRINT''''"PRINTER on (1) OR off (0)";:pX=GET-48:IF pX<>1 pX=0
880CLS:IF (pX=1 AND cX=1) VDU2
890IF TX=2 PROCstar:GOTO 970
900OSCLI"FX6":REM Generate extra CR's for MSX printer
910IF LX=2:REM MSX code for 12 inch papier (I don't know by now)
920REM ++++++++++++++++++++++++++++++++
930REM + Output to screen & printer +
940REM ++++++++++++++++++++++++++++++++
950VDU1,27,1,ASC"!",1,14:PRINT'VERKOPER$;:VDU1,15:REM Enlarged/Condensed
960VDU1,27,1,ASC"C",1,ASC"B":PRINTSPC3;BEDRIJF$:VDU1,27,1,ASC"C",1,ASC"b"
970PRINTSTRING$(79,CHR$45)
980PRINTADRES$;TAB(59);W1$'ADRES2$;SPC5;"Rekening voor de Heer:";TAB(64);W2$
990PRINTTELF$;TAB(25);naam$;TAB(66)W3$'BANK$;TAB(25)adres$;TAB(64)W4$
1000PRINTNR$;TAB(25);place$;TAB(66);W5$'GIRO$;TAB(68)W6$'REEKvK$;TAB(60)W7$
1010PRINTREGL$;TAB(73)W8$'TAB(75)W9$'TAB(61);"No ";REKX
1020PRINT"voor geleverd:";SPC15;"Ouddorp, ";datum$'STRING$(79,CHR$45)
1030PRINT"Datum ";SPC30;"Omschrijving";SPC14;"Te betalen bedrag":totaal=0
1040PRINTSTRING$(79,CHR$45):@X=&2020A:BX=0:subtotaal=0
1050
1060REM Print date, description and price for line BX, calculate subtotal
1070FOR BX=1 TO AX:bedrag=VAL(BEDRAG$(BX))
1080PRINT DATE$(BX);TAB(9);OMSCHR$(BX);TAB(74-FNpos(bedrag));bedrag
1090subtotaal=subtotaal+bedrag
1100NEXT BX
1110PRINTSTRING$(79,CHR$45)'TAB(54)"Subtotaal f";
1120
1130subtotaal=INT(subtotaal*100+0.5)/100
1140PRINTTAB(74-FNpos(subtotaal));subtotaal
1150IF ko THEN PROCkorting(subtotaal)
1160PROCbtw(subtotaal)
1170PRINTTAB(64);STRING$(10,CHR$45)
1180PRINTTAB(57)"Totaal f";TAB(74-FNpos(totaal));totaal
1190PRINTTAB(74-FNpos(totaal));STRING$(FNpos(totaal),"="):@X=&90A
1200IF TX=1 VDU1,27,1,34,3 ELSE IF TX=2 VDU1,12,1,27,1,64,3:REM FormFeed & printer reset
1210PRINT''"Druk op een toets":dX=GET:ENDPROC
1220
1230DEFPROCold_data
1240naam$="'NAAM KLANT'":datum$="'HUIDIGE DATUM'":BTW$="6":kort$="5":Z=0
1250adres$="'ADRES KLANT'":place$="'WOONPLAATS KLANT'":REKX=1000+RND(9000):ko=TRUE:BTW=20
1260IF TX=2 THEN a$=CHR$193 ELSE IF TX=1 THEN a$=CHR$133 ELSE a$="a"
1270RESTORE1400:REPEAT:Z=Z+1:READ D$:IF D$="-1" GOTO1310
1280READ NR,@$,ART$,P$
1290DATE$(Z)=D$:OMSCHR$(Z)=STR$(NR)+"x "+@$+" "+ART$+" "+a$+" f "+P$
1300BEDRAG$(Z)=STR$(INT(NR*VAL(P$)*100+.5)/100)
1310UNTIL D$="-1":Z=Z-1:N_ART=Z:AX=Z:dataX=1
1320IF N_ART<10 THEN REPEAT:AX=AX+1:DATE$(AX)="..-..":OMSCHR$(AX)=STRING$(54,"."):BEDRAG$="0":UNTIL AX=10
1330ENDPROC
1340
```

```
1350DEFFNpos(value):value%=value*100:IF value%<100 THEN =4
1360=LEN(STR$(value%))+1
1370
1380DATA 01-04,2,1/2,lt Groen-Ex,7.00
1390DATA 02-04,3,1/1,sp Vlido,4.00
1400DATA 03-04,1,1/1,pk Slakkenkorrels (AAGRUNOL),4.00
1410DATA 04-04,1,1/1,pk Muizentarwe,3.00
1420DATA 08-04,5,1/1,pk Rattenkorrels,3.98
1430DATA 10-04,9,1/1,lt Groen-Ex,13.50
1440DATA -1
1450
1460DEFPROCkorting(money)
1470KOR=(money/100)*VAL(kort$)
1480KOR=INT(KOR*100+0.5)/100
1490PRINTTAB(52);"Korting ";kort$;"%  f";TAB(74-FNpos(KOR));KOR;" -"
1500subtotaal=money-KOR
1510PRINTTAB(64);STRING$(10,CHR$45)
1520PRINTTAB(54);"Subtotaal f ";TAB(74-FNpos(subtotaal));subtotaal
1530ENDPROC
1540
1550DEFPROCbtw(money):@%=&2020A
1560PRINTTAB(56);"Btw ";BTW$;"%";TAB(64)"f";:btw=(money/100)*VAL(BTW$)
1570btw=INT(btw*100+0.5)/100:PRINTTAB(74-FNpos(btw));btw;" +"
1580totaal=money+btw:ENDPROC
1590
1600DEFPROCstar:VDU1,27,1,64,1,27,1,50:REM init printer, LF = 1/6 inch
1610VDU1,27,1,67,1,0,1,-1*(LZ%=2)+11:REM 11 or 12 inch paper
1620VDU1,14:PRINTVERKOPER$;:VDU1,27,1,87,1,0,1,27,1,69:PRINTSPC3;BEDRIJF$
1630VDU1,27,1,70:ENDPROC:REM Enlarged/Condensed Normal print style
1640
1650REM This program is written on a Acorn Electron 64k with a Star gemini 10x
1660REM printer, and is also compatible with a MSX2 printer.
1670REM It runs on an 32k Electron without diskdrive too.
1680REM Below follows a list of commands for BBC-BASIC / other BASICs
1690REM
1700REM MODE0      -> 80 x 32 characters mode
1710REM @%=&90A    -> Print characters with a field with of ten (as normal)
1720REM @%=&2020A  -> Same as 'PRINT USING "######.##"; .... '
1730REM VDU23,...  -> Define a character
1740REM B1,Bh      -> BTW (VAT) Low (6%) and high (20%)
1750REM PRINT'     -> PRINT:PRINT
1760REM STRING$(nr,"text")  -> make string of nr copies of 'text'
1770REM VDU2/VDU3  -> Printer on / off
1780REM VDU1,...   -> next code (...) to printer
1790REM PROCname   -> calls procedure (=subroutine) name
1800REM DEFPROCname...ENDPROC  -> Definition of procedure
1810
1820REM Idea by   : Peter Grinwis,  Weststraat 41, Ouddorp
1830REM Program by: Simon Voortman, Beatrixweg 28, Ouddorp
```

JAN GRINWIS Pzn Gewasbeschermingsbedrijf

Weststraat 41
3253 AR Ouddorp Z.H.
Telef. 01878-1686
Bank: Rabo
No. ----.--.---
Giro -------
Reg.no. K.v.K. ------
Reg.no. -. -------- -

Referentie voor de Heer:
'NAAM KLANT'
'ADRES KLANT'
'WOONPLAATS KLANT'

hand- en machinewerk
rijenbespuiting
lapbespuiting
wegenbespuiting
erfbespuiting
watergangen
dijken en weilanden
gazons
enz.

No 8892

voor geleverd: Ouddorp, 'HUIDIGE DATUM'

Datum	Omschrijving	Te betalen bedrag
03-04	1x 1/1 pk Slakkenkorrels (AAGRUNOL) à f 4.00	4.00
04-04	1x 1/1 pk Muizentarwe à f 3.00	3.00
08-04	5x 1/1 pk Rattenkorrels à f 3.98	19.90
10-04	9x 1/1 lt Groen-Ex à f 13.50	121.50
..-..-..	.....	0.00
..-..-..	.....	0.00
..-..-..	.....	0.00
..-..-..	.....	0.00
..-..-..	.....	0.00
..-..-..	.....	0.00

Subtotaal	f	148.40
Korting 5%	f	7.42 -
Subtotaal	f	140.98
Btw 6%	f	8.46 +
Totaal	f	149.44

```
EPROM BANKSWITCHING          PROTON 650X ASSEMBLER  V4.4   PAGE: 0001

0001  0000                .TIT 'EPROM BANKSWITCHING'
0002  0000                .OPT GEN
0003  0000          ;
0004  0000          ; AUTEUR : F.J.M. SMEEHUIJZEN
0005  0000          ;          LIPPEDAL 19
0006  0000          ;          2904 CL CAPELLE AAN DEN IJSSEL
0007  0000          ;          TEL: 010-4512507
0008  0000          ;
0009  0000          ; ONDANKS HET GEBRUIK VAN FLOPPY DISK'S WAARDOOR HET NAAR
0010  0000          ; BINNEN HALEN VAN PROGRAMMA'S SNEL KAN GEBEUREN, BLIJFT
0011  0000          ; DE SNELSTE METHODE TOCH DOOR DIREKT VANUIT HET GEHEUGEN
0012  0000          ; OP TE STARTEN.
0013  0000          ; WAT EEN LUXE ZOU HET ZIJN OM DIREKT EN EEN EDITOR, EEN
0014  0000          ; ASSEMBLER, EEN BASIC INTERPRETER EN ALLERLEI HANDIGE
0015  0000          ; HULPPROGRAMMA'S DIREKT BESCHIKBAAR TE HEBBEN.
0016  0000          ; DE KONSEQUENTIE IS DAN EVENWEL HET GEBRUIK VAN EEN GROTE
0017  0000          ; HOEVEELHEID INTERN GEHEUGEN IN DE VORM VAN EPROM'S, WAAR-
0018  0000          ; DOOR VOOR HET RAM-GEHEUGEN STEEDS MINDER OVERBLIJFT, OM-
0019  0000          ; DAT WE NU EENMAAL NIET MEER DAN 64KB KUNNEN ADRESSEREN.
0020  0000          ;
0021  0000          ; MET GEBRUIKMAKING VAN HET DOOR ELEKTUUR ONTWORPEN EPROM-
0022  0000          ; SWITCHBOARD IN FEBRUARI 1985 IS HET MOGELIJK OM VAN HET
0023  0000          ; ENE NAAR HET ANDERE EPROM TE SPRINGEN DOOR SIMPELWEG HET
0024  0000          ; BETREFFENDE EPROM NUMMER (0 T/M 3) NAAR EEN DUMMY-ADRES
0025  0000          ; IN EPROM TE SCHRIJVEN.
0026  0000          ; HIERDOOR WORDT DIT EPROM GESELEKTEERD EN KUNNEN DE ZICH
0027  0000          ; DAARIN BEVINDENDE PROGRAMMA'S WORDEN UITGEVOERD.
0028  0000          ; OM EEN EN ANDER IN GOEDE BANEN TE LEIDEN, ZONDER 'HANG-
0029  0000          ; UP'S' TE VEROORZAKEN, DIENEN EEN AANTAL ZAKEN GEREGELD
0030  0000          ; TE WORDEN.
0031  0000          ;
0032  0000          ; ALLEREERST DIENT IN IEDERE EPROM DE RESET-VEKTOR OP DE
0033  0000          ; ADRESSEN FFFC EN FFFD AANWEZIG TE ZIJN WELKE WIJST NAAR
0034  0000          ; BIJVOORBEELD HET 'COLD-START ADRES' VAN DE EDITOR, AS-
0035  0000          ; SEMBLER OF BASIC OF NAAR EEN ROUTINE BINNEN DE EPROM
0036  0000          ; WAARBIJ WEER TERUGGESCHAKELD WORDT NAAR DE MONITOR-EPROM.
0037  0000          ;
0038  0000          ; GEBRUIK MAKEN VAN MONITOR ROUTINES DIENT VIA EEN ZGN.
0039  0000          ; DUMMY JUMP-TABLE TE LOPEN, WELKE TABEL ZICH BUITEN HET
0040  0000          ; GEHEUGENGEBIED VAN DE 4 GEHEUGENBANKS DIENT TE BEVINDEN.
0041  0000          ; IN ONDERSTAANDE VOORBEELDROUTINE IS GEKOZEN VOOR $C000.
0042  0000          ;
0043  0000          ; NU DE PRAKTISCHE KANT VAN DE ZAAK:
0044  0000          ;
0045  0000          ; HIERONDER EEN SCHEMATISCHE WEERGAVE VAN DE VERSCHILLENDE
0046  0000          ; EPROM'S MET DE DAARIN GEPLAATSTE SOFTWARE.
0047  0000          ;
0048  0000          ; EPROM   #1        #2        #3        #4
0049  0000          ;      --------  --------  --------  --------  --------
0050  0000          ;     |$E000 |  |$E000 |  |$E000 |  |$E000 |  |$C000 |
0051  0000          ;     |      |  |      |  |      |  |      |  |      |
0052  0000          ;     |  M   |  |  E   |  |  A   |  |  B   |  |  D   |
0053  0000          ;     |  O   |  |  D   |  |  S   |  |  A   |  |  U   |
0054  0000          ;     |  N   |  |  I   |  |  S   |  |  S   |  |  M   |
0055  0000          ;     |  I   |  |  T   |  |  E   |  |  I   |  |  M   |
0056  0000          ;     |  T   |  |  O   |  |  M   |  |  C   |  |  Y   |
0057  0000          ;     |  O   |  |  R   |  |  B   |  |      |  |  T   |
0058  0000          ;     |  R   |  |------|  |  L   |  |      |  |  A   |
0059  0000          ;     |      |  |  U   |  |  E   |  |      |  |  B   |
0060  0000          ;     |      |  |  T   |  |  R   |  |      |  |  E   |
0061  0000          ;     |      |  |  I   |  |------|  |      |  |  L   |
0062  0000          ;     |      |  |  L   |  |      |  |      |  |      |
0063  0000          ;     --------  --------  --------  --------  --------
0064  0000          ;
0065  0000          ; HET NU VOLGENDE OVERZICHT FUNKTIONEERT UITSTEKEND OP DE
0066  0000          ; CPU/VDU KOMBINATIE VAN ELEKTUUR MET ALS OPERATING SYSTEM
0067  0000          ; HET PROTON DOS IN 2764 EPROM'S.
0068  0000          ; DEZE MONITOR HEEFT VANAF ADRES $E000 EEN INDIREKTE JUMP-
0069  0000          ; TABEL NAAR ROUTINES WELKE DOOR IEDER PROGRAMMA KUNNEN
0070  0000          ; WORDEN AANGEROEPEN.
0071  0000          ; EEN AANTAL VAN DEZE ROUTINES WORDEN IN ONDERSTAAND VOOR-
0072  0000          ; BEELD PROGRAMMA GEBRUIKT OM E.E.A. TE VERDUIDELIJKEN.
0073  0000          ; DE ROUTINES ZELF ZIJN AAN HET EIND VAN HET PROGRAMMA
0074  0000          ; ALLEEN DOOR EEN 'RTS' VOORGESTELD.
```

```
EPROM BANKSWITCHING          PROTON 650X ASSEMBLER  V4.4   PAGE: 0002

0075  0000          ;
0076  0000          ; HET STARTEN VAN DE DIVERSE PROGRAMMA'S GEBEURT MET BE-
0077  0000          ; HULP VAN 'FUNKTIETOETSEN'.
0078  0000          ; DE PROTON MONITOR REGELT NA HET INTOETSEN VAN EEN E,A OF B
0079  0000          ; EEN SPRONG NAAR DE LABELS EKEY, AKEY EN BKEY WAARNA HET
0080  0000          ; OPSTARTEN VAN HET GEWENSTE PROGRAMMA VIA DE VOORAF IN-
0081  0000          ; GEVULDE VECTOR (ADRES $0300 EN HOGER IN HET VOORBEELD),
0082  0000          ; PLAATS VINDT.
0083  0000          ;
0084  0000          ; E-TOETS IS DE EDITOR
0085  0000          ; A-TOETS IS DE ASSEMBLER
0086  0000          ; B-TOETS IS DE BASIC INTERPRETER
0087  0000          ;
0088  0000          ; *** ORIGINAL MONITOR ROUTINE ADDRESSES IN EPROM #1 ***
0089  0000          ;
0090  0000                  *=$E000
0091  E000          ;
0092  E000  00F0            .WOR COMIN        ; WARM RESTART OF MONITOR
0093  E002  01F0            .WOR WHEREI       ; ASK FOR INPUT DEVICE
0094  E004  02F0            .WOR WHERED       ; ASK FOR OUTPUT DEVICE
0095  E006  03F0            .WOR INALL        ; INPUT FROM ACTIVE INPUT DEVICE
0096  E008  04F0            .WOR OUTALL       ; OUTPUT TO ACTIVE OUTPUT DEVICE
0097  E00A  05F0            .WOR CLOSEI       ; CLOSE ACTIVE INPUT DEVICE
0098  E00C  06F0            .WOR CLOSED       ; CLOSE ACTIVE OUTPUT DEVICE
0099  E00E  07F0            .WOR GETTTY       ; TERMINAL INPUT ROUTINE
0100  E010  08F0            .WOR OUTPUT       ; TERMINAL OUTPUT ROUTINE
0101  E012          ;
0102  E012          ; *** BANK START ADDRESSES ****
0103  E012          ;
0104  E012                  *=$E000
0105  E000          ;
0106  E000          EDITOR  *=*+0             ; EDITOR IN EPROM #2
0107  E000          ASMBL   *=*+0             ; ASSEMBLER IN EPROM #3
0108  E000          BASIC   *=*+0             ; BASIC IN EPROM #4
0109  E000          ;
0110  E000                  *=$FFFF
0111  FFFF          ;
0112  FFFF          DUMMY   *=*+1             ; DUMMY ADDRESS IN EPROM
0113  0000          ;
0114  0000                  *=$0200
0115  0200          ;
0116  0200          BANK    *=*+1             ; SELECTED BANK NUMBER POINTER
0117  0201          ;
0118  0201                  *=$0300
0119  0300          ;
0120  0300          ; *** FUNCTION VECTORS ***
0121  0300          ;
0122  0300  67C0    EDTVEC  .WOR EDT65        ; INDIRECT JUMP TO EDITOR
0123  0302  72C0    ASMVEC  .WOR ASM65        ; INDIRECT JUMP TO ASSEMBLER
0124  0304  7DC0    BASVEC  .WOR BAS65        ; INDIRECT JUMP TO BASIC
0125  0306          ;
0126  0306                  *=$C000
0127  C000          ;
0128  C000          ; *** JUMP TABLE FOR BANK SWITCHED SOFTWARE ***
0129  C000          ;
0130  C000  2056C0 E000    JSR BANK0         ; SWITCH TO MONITOR-EPROM
0131  C003  4C00F0          JMP COMIN         ; RETURN TO MONITOR
0132  C006  2056C0 E002    JSR BANK0         ; SWITCH TO MONITOR-EPROM
0133  C009  2001F0          JSR WHEREI        ; DETERMINE INPUT DEVICE
0134  C00C  205EC0          JSR BANK1         ; RETURN TO SELECTED EPROM
0135  C00F  60              RTS
0136  C010  2056C0 E004    JSR BANK0         ; SWITCH TO MONITOR-EPROM
0137  C013  2002F0          JSR WHEREO        ; DETERMINE OUTPUT DEVICE
0138  C016  205EC0          JSR BANK1         ; RETURN TO SELECTED EPROM
0139  C019  60              RTS
0140  C01A  2056C0 E006    JSR BANK0         ; SWITCH TO MONITOR-EPROM
0141  C01D  2003F0          JSR INALL         ; INPUT FROM ACTIVE INPUT DEVICE
0142  C020  205EC0          JSR BANK1         ; RETURN TO SELECTED EPROM
0143  C023  60              RTS
0144  C024  2056C0 E008    JSR BANK0         ; SWITCH TO MONITOR-EPROM
0145  C027  2004F0          JSR OUTALL        ; OUTPUT TO ACTIVE OUTPUT DEVICE
0146  C02A  205EC0          JSR BANK1         ; RETURN TO SELECTED EPROM
0147  C02D  60              RTS
0148  C02E  2056C0 E00A    JSR BANK0         ; SWITCH TO MONITOR-EPROM
0149  C031  2005F0          JSR CLOSEI        ; CLOSE INPUT DEVICE
0150  C034  205EC0          JSR BANK1         ; RETURN TO SELECTED EPROM
0151  C037  60              RTS
```

```
EPROM BANKSWITCHING          PROTON 650X ASSEMBLER  V4.4   PAGE: 0003


0152  C038  2056C0 E00C     JSR BANK0          ; SWITCH TO MONITOR-EPROM
0153  C03B  2006F0          JSR CLOSEO         ; CLOSE OUTPUT DEVICE
0154  C03E  205EC0          JSR BANK1          ; RETURN TO SELECTED EPROM
0155  C041  60              RTS
0156  C042  2056C0 E00E     JSR BANK0          ; SWITCH TO MONITOR-EPROM
0157  C045  2007F0          JSR GETTTY         ; TERMINAL INPUT ROUTINE
0158  C048  205EC0          JSR BANK1          ; RETURN TO SELECTED EPROM
0159  C04B  60              RTS
0160  C04C  2056C0 E010     JSR BANK0          ; SWITCH TO MONITOR-EPROM
0161  C04F  2008F0          JSR OUTPUT         ; TERMINAL OUTPUT ROUTINE
0162  C052  205EC0          JSR BANK1          ; RETURN TO SELECTED EPROM
0163  C055  60              RTS
0164  C056                  ;
0165  C056                  ; *** SWITCH TO MONITOR-EPROM ***
0166  C056                  ;
0167  C056  48      BANK0   PHA                ; SAVE ACCU
0168  C057  A900            LDA #$00           ; NUMBER OF MONITOR-EPROM
0169  C059  8DFFFF          STA DUMMY          ; WRITE TO DUMMY ADDRESS
0170  C05C  68              PLA                ; RESTORE ACCU
0171  C05D  60              RTS
0172  C05E                  ;
0173  C05E                  ; *** SWITCH TO SELECTED EPROM ***
0174  C05E                  ;
0175  C05E  48      BANK1   PHA                ; SAVE ACCU
0176  C05F  AD0002          LDA BANK           ; LOAD SELECTED BANK NUMBER
0177  C062  8DFFFF          STA DUMMY          ; AND WRITE TO DUMMY ADDRESS
0178  C065  68              PLA                ; RESTORE ACCU
0179  C066  60              RTS
0180  C067                  ;
0181  C067                  ; *** SWITCH TO EDITOR EPROM ***
0182  C067                  ;
0183  C067  A901    EDT65   LDA #$01           ; LOAD EPROM NUMBER
0184  C069  8D0002          STA BANK           ; SAVE SELECTED BANK NUMBER
0185  C06C  8DFFFF          STA DUMMY          ; WRITE TO DUMMY ADDRESS
0186  C06F  4C00E0          JMP EDITOR         ; JUMP TO EDITOR IN EPROM #2
0187  C072                  ;
0188  C072                  ; *** SWITCH TO ASSEMBLER EPROM ***
0189  C072                  ;
0190  C072  A902    ASM65   LDA #$02           ; LOAD EPROM NUMBER
0191  C074  8D0002          STA BANK           ; SAVE SELECTED BANK NUMBER
0192  C077  8DFFFF          STA DUMMY          ; WRITE TO DUMMY ADDRESS
0193  C07A  4C00E0          JMP ASMBL          ; JUMP TO ASSEMBLER IN EPROM #3
0194  C07D                  ;
0195  C07D                  ; *** SWITCH TO BASIC EPROM ***
0196  C07D                  ;
0197  C07D  A903    BAS65   LDA #$03           ; LOAD EPROM NUMBER
0198  C07F  8D0002          STA BANK           ; SAVE SELECTED BANK NUMBER
0199  C082  8DFFFF          STA DUMMY          ; WRITE TO DUMMY ADDRESS
0200  C085  4C00E0          JMP BASIC          ; JUMP TO BASIC IN EPROM #4
0201  C088                  ;
0202  C088                  *=$F000
0203  F000                  ;
0204  F000                  ; *** ROUTINES IN MONITOR EPROM WHERE RTS REPRESENTS ***
0205  F000                  ; *** A DUMMY FOR THE ORIGINAL MONITOR ROUTINES     ***
0206  F000                  ;
0207  F000  60      COMIN   RTS
0208  F001  60      WHEREI  RTS
0209  F002  60      WHEREO  RTS
0210  F003  60      INALL   RTS
0211  F004  60      OUTALL  RTS
0212  F005  60      CLOSEI  RTS
0213  F006  60      CLOSEO  RTS
0214  F007  60      GETTTY  RTS
0215  F008  60      OUTPUT  RTS
0216  F009                  ;
0217  F009                  ;
0218  F009  6C0003  EKEY    JMP (EDTVEC)       ; FUNKTIETOETS 'E
0219  F00C  6C0203  AKEY    JMP (ASMVEC)       ; FUNKTIETOETS 'A'
0220  F00F  6C0403  BKEY    JMP (BASVEC)       ; FUNKTIETOETS 'B'
0221  F012                  ;
0222  F012                  .END

ERRORS: 0000                          (0000)
```

```
                          1  ;+-----------------------------------------------------------+
                          2  ;|                                                           |
                          3  ;|       RELOCATE start,end,offset,start_adjust,end_adjust   |
                          4  ;|                                                           |
                          5  ;|       New DOS65 command to relocate the absolute addresses|
                          6  ;|       in machine code programs                            |
                          7  ;|                                                           |
                          8  ;+-----------------------------------------------------------+
                          9  ;
          0400           10          org     $400
                         12  ;
                         13  ; constants
                         14  ;
          000D           15  cr      equ     $d
          000C           16  formf   equ     $c
                         17  ;
                         18  ; Zero page addresses
                         19  ;
          00F0           20  flag    equ     $f0             ;flag for newline
          00F2           21  tema    equ     $f2             ;temp. store for start-address
          00F4           22  temb    equ     $f4             ;temp. store for end-address
          00F6           23  temc    equ     $f6             ;temp. store for offset
          00E8           24  temd    equ     $e8             ;temp. store for start-adjust
          00EA           25  teme    equ     $ea             ;temp. store for end-adjust
                         26  ;
                         27  ; DOS65 routines
                         28  ;
          C02F           29  crlf    equ     $c02f           ;print CRLF
          C032           30  space   equ     $c032           ;print space
          C03B           31  print   equ     $c03b           ;print string till 0
          C06B           32  spar    equ     $c06b           ;scan parameters
          C023           33  output  equ     $c023           ;print character
          C038           34  hexout  equ     $c038           ;print A in hex.
          D0B7           35  ermes   equ     $d0b7           ;print error message
                         36  ;-----------------------------------------------------------
0400 A2 00               37  relocat ldx     #0
0402 20 6BC0             38          jsr     spar            ;get parameters
0405 F2F4                39          fcc     tema,temb
0407 F6E8EA00            40          fcc     temc,temd,teme,0
040B B0 07               41          bcs     1.f             ;error in parameters
040D E0 F8               42  reloc   cpx     #$f8
040F F0 49               43          beq     relg1
0411 4C F104             44          jmp     erda            ;not enough parameters
0414 4C B7D0             45  1       jmp     ermes
0417 A2 F2               46  relb    ldx     #tema
0419 20 7004             47          jsr     opclen          ;get opcode length
041C C0 03               48          cpy     #3              ;absolute?
041E D0 45               49          bne     reli            ;no
0420 20 B904             50          jsr     xinc            ;else point to address
0423 A0 01               51          ldy     #1
0425 A5 EA               52          lda     teme            ;check if in adjust area
0427 C1 00               53          cmp     [0,x]
0429 A1 00               54          lda     [0,x]
042B AA                  55          tax
042C A5 EB               56          lda     teme+1
042E F1 F2               57          sbc     [tema],y
0430 90 31               58          bcc     relh            ;no, too large
0432 E4 E8               59          cpx     temd
0434 B1 F2               60          lda     [tema],y
0436 E5 E9               61          sbc     temd+1
0438 90 29               62          bcc     relh            ;no, too small
043A 18                  63          clc                     ;else add offset
043B 8A                  64          txa
043C 65 F6               65          adc     temc            ;low
043E 48                  66          pha
043F B1 F2               67          lda     [tema],y
0441 65 F7               68          adc     temc+1          ;and high part
0443 91 F2               69          sta     [tema],y        ;adjust in memory
0445 88                  70          dey
0446 68                  71          pla
0447 91 F2               72          sta     [tema],y        ;adjust in memory
0449 A2 F2               73          ldx     #tema
044B 20 C004             74          jsr     xdec            ;reset pointer to opcode
044E 20 A204             75  relg    jsr     outins          ;print adjusted opcode
```

```
0451 B0 1A          76          bcs     relia           ;if C then at end
0453 20 E104        77          jsr     twospa          ;print two spaces
0456 C6 F0          78          dec     flag            ;and decr. flag
0458 D0 BD          79          bne     relb            ;if not zero, continue
045A A9 04          80  relgl   lda     #4              ;else reset flag
045C 85 F0          81          sta     flag            ;(four opcode/line)
045E 20 2FC0        82          jsr     crlf            ;and do <newline>
0461 90 B4          83          bcc     relb            ;then continue
0463 A0 02          84  relh    ldy     #2              ;point to next opcode
0465 20 CB04        85  reli    jsr     incbrk
0468 88             86          dey
0469 D0 FA          87          bne     reli
046B 90 AA          88          bcc     relb            ;if C=0 continue
046D 4C 2FC0        89  relia   jmp     crlf            ;else return to DOS65
                    90  ;---------------------------------------------------------------
                    91  ;                               Subroutines
                    92  ;---------------------------------------------------------------
                    93  ;
                    94  ; return opcode length in Y
                    95  ;
0470 A0 01          96  opclen  ldy     #1
0472 A1 00          97          lda     [0,x]
0474 F0 1B          98          beq     opcj
0476 C9 40          99          cmp     #$40            ;RTI?
0478 F0 17         100          beq     opcj
047A C9 60         101          cmp     #$60            ;RTS?
047C F0 13         102          beq     opcj
047E A0 03         103          ldy     #3
0480 C9 20         104          cmp     #$20            ;JSR?
0482 F0 0D         105          beq     opcj
0484 29 1F         106          and     #$1f
0486 C9 19         107          cmp     #$19
0488 F0 07         108          beq     opcj
048A 29 0F         109          and     #$f
048C A8            110          tay
048D B9 9204       111          lda     opctb,y         ;get length from table
0490 A8            112          tay
0491 60            113  opcj    rts
                   114  ;
0492 0202020102    115  opctb   fcc     2,2,2,1,2,2,2,1,1,2,1,1,3,3,3,1
                   116  ;
                   117  ; Print adjusted opcode
                   118  ;
04A2 20 7004       119  outins  jsr     opclen          ;get opcode length
04A5 20 E704       120          jsr     outxad          ;print current address
04A8 20 3BC0       121          jsr     print
04AB 203A2000      122          fcc     ' : ',0
04AF 20 DA04       123  oinsa   jsr     outmeb          ;print byte
04B2 20 CB04       124          jsr     incbrk          ;point to next
04B5 88            125          dey
04B6 D0 F7         126          bne     oinsa           ;until end of opcode
04B8 60            127          rts
                   128  ;
                   129  ; Incr. 16 bits address where X is pointing to
                   130  ;
04B9 F6 00         131  xinc    inc     0,x
04BB D0 02         132          bne     xincb
04BD F6 01         133          inc     1,x
04BF 60            134  xincb   rts
                   135  ;
                   136  ; Decr. 16 bits address where X is pointing to
                   137  ;
04C0 48            138  xdec    pha
04C1 B5 00         139          lda     0,x
04C3 D0 02         140          bne     xdecb
04C5 D6 01         141          dec     1,x
04C7 D6 00         142  xdecb   dec     0,x
04C9 68            143          pla
04CA 60            144          rts
                   145  ;
                   146  ; Incr. and check if at end
                   147  ;
04CB A5 F2         148  incbrk  lda     tema            ;incr. start-address
04CD C5 F4         149          cmp     temb            ;and check if at end
```

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```
04CF A5 F3          150           lda     tema+1
04D1 E5 F5          151           sbc     temb+1
04D3 E6 F2          152           inc     tema
04D5 D0 02          153           bne     incb
04D7 E6 F3          154           inc     tema+1
04D9 60             155  incb     rts                     ;C=1, if at end
                    156  ;
                    157  ; Print byte
                    158  ;
04DA A1 00          159  outmeb    lda     [0,x]           ;get byte
04DC 20 38C0        160  outmea    jsr     hexout          ;print in hex
04DF 90 03          161           bcc     outspa          ;branch always
                    162  ;
04E1 20 32C0        163  twospa    jsr     space           ;print space
04E4 4C 32C0        164  outspa    jmp     space           ;and another
                    165  ;
                    166  ; Print address
                    167  ;
04E7 B5 01          168  outxad    lda     1,x             ;get address hi
04E9 20 38C0        169           jsr     hexout          ;print in hex.
04EC B5 00          170           lda     0,x             ;get address lo
04EE 4C 38C0        171           jmp     hexout          ;print it
                    172  ;
                    173  ; Help info if error in parameters
                    174  ;
04F1 20 3BC0        175  erda     jsr     print
04F4 0C52454C4F     176           fcc     formf,'RELOCATE HELP',cr,cr
0504 436F6D6D61     177           fcc     'Command syntax:',cr
0514 52454C4F43     178           fcc     'RELOCATE aaaa,bbbb,cccc,dddd,eeee',cr,cr
0537 6161616120     179           fcc     'aaaa  : Startaddress of memory area to be relocated',cr
056B 6262626220     180           fcc     'bbbb  : Endaddress of memory area',cr
058D 6363636320     181           fcc     'cccc  : Offset',cr
059C 6464646420     182           fcc     'dddd  : Start of address area to be adjusted',cr
05C9 6565656520     183           fcc     'eeee  : End of address area to be adjusted',cr,cr
05F5 457861 6D70    184           fcc     'Example:',cr
05FE 50726F6772     185           fcc     'Program to be relocated is resident at $2000 to $2200, suppose you want to',cr
0649 7573652074     186           fcc     'use this program at $3000 to $3200, so only absolute addresses in the area',cr
0694 2432303030     187           fcc     '$2000 to $2200 have to be adjusted. The offset is $1000 so enter:',cr,cr
06D7 52454C4F43     188           fcc     'RELOCATE 2000,2200,1000,2000,2200',cr,cr
06FA 5468652061     189           fcc     'The adjusted addresses are displayed for control purposes (see note)',cr
073F 4E6F74653A     190           fcc     'Note: Beware for data or tables in the relocated addressarea, the program',cr
0789 2020202020     191           fcc     '      cannot see the difference between opcodes in a program and characters',c
07D5 2020202020     192           fcc     '      like $20 (ASCII space) and $4C (ASCII L), so use RELOCATE with care.',cr
0821 60             193           rts
     0400           194           end     relocat
                                   global labels

cr        000D  crlf      C02F  erda      04F1  ermes     D0B7  flag      00F0
formf     000C  hexout    C038  incb      04D9  incbrk    04CB  oinsa     04AF
opcj      0491  opclen    0470  opctb     0492  outins    04A2  outmea    04DC
outmeb    04DA  output    C023  outspa    04E4  outxad    04E7  print     C03B
relb      0417  relg      044E  relgl     045A  relh      0463  reli      0465
relia     046D  reloc     040D  relocat   0400  space     C032  spar      C06B
tema      00F2  temb      00F4  temc      00F6  temd      00E8  teme      00EA
twospa    04E1  xdec      04C0  xdecb     04C7  xinc      04B9  xincb     04BF

Errors detected: 0
```

```
SOURCE FILE: CONVERSIE
0000:              1 ;**** HEX/DEC EN DEC/HEC CONVERSIE ****
0000:              2 ;
0000:              3 ;      DOOR HANS BOSCH,
0000:              4 ;      REELAAN 35,
0000:              5 ;      7522 LS ENSCHEDE.
0000:              6 ;
0000:              7 ;APPLESOFT EN MONITOR ROUTINES
DD67:              8 FRMNUM   EQU  $DD67      EXPRESSIE NAAR FAC
E752:              9 GETADR   EQU  $E752      FAC NAAR INTEGER IN LINNUM
ED24:             10 LINPRT   EQU  $ED24      PRINT 2-BYTE NUMMER IN X(LSB) EN A(MSB)
F941:             11 PRNTAX   EQU  $F941      PRINT A EN X REGISTER
F948:             12 PRBLNK   EQU  $F948      PRINT 3 SPATIES
FC22:             13 VTAB     EQU  $FC22      ZET VTAB NAAR CV
FDED:             14 COUT     EQU  $FDED      OUTPUT ROUTINE
FFA7:             15 GETNUM   EQU  $FFA7      CONVERTEER VAN HEX NAAR DEC
0000:             16 ;
0000:             17 ;MEMORY
0024:             18 CH       EQU  $24        CURSOR HORIZONTAAL
0025:             19 CV       EQU  $25        CURSOR VERTICAAL
003E:             20 A2L      EQU  $3E        RESULTAAT HEX/DEC CONVERSIE
0050:             21 LINNUM   EQU  $50        RESULTAAT DEC/HEX CONVERSIE
0200:             22 BUF      EQU  $200       INPUT BUFFER
03F6:             23 AMPERV   EQU  $3F6       AMPERSAND VECTOR
0000:             24 ;
----- NEXT OBJECT FILE NAME IS CONVERSIE.OBJ0
6000:             25          ORG  $6000
6000:             26 ;BRUN CONVERSIE.OBJ0 VOOR GEBRUIK AMPERSAND
6000:A9 0B        27 INIT     LDA  #)START   LSB START ADRES
6002:8D F6 03     28          STA  AMPERV
6005:A9 60        29          LDA  #(START   MSB
6007:8D F7 03     30          STA  AMPERV+1  &VECTOR WIJST NU NAAR START ADRES
600A:60           31          RTS
600B:             32 ;
600B:48           33 START    PHA            BERG A-REGISTER OP
600C:A0 09        34          LDY  #9
600E:C6 25        35          DEC  CV        NAAR VORIGE REGEL
6010:20 22 FC     36          JSR  VTAB
6013:84 24        37          STY  CH        TAB POSITIE OP Y
6015:68           38          PLA            HAAL A-REGISTER TERUG
6016:C9 24        39          CMP  #$24      $(HEX) INVOER?
6018:D0 31        40          BNE  DEC
601A:             41 ;
601A:             42 ;HEX-DEC CONVERSIE
601A:BD 00 02     43 HEX1     LDA  BUF,X     X WIJST  ALTIJD VOORBIJ LAATSTE DIGIT
601D:09 80        44          ORA  #$80
601F:9D 00 02     45          STA  BUF,X     MAAK ALLE 7E BITS IN BUF HOOG
6022:CA           46          DEX
6023:D0 F5        47          BNE  HEX1
6025:A0 02        48          LDY  #2        WIJS NAAR 1E DIGIT IN BUFFER ($0202)
6027:20 A7 FF     49          JSR  GETNUM
602A:A6 3E        50 HEX2     LDX  A2L       LSB
602C:A5 3F        51          LDA  A2L+1     MSB
602E:20 24 ED     52          JSR  LINPRT    UITVOER RESULTAAT
6031:24 3F        53          BIT  A2L+1     RESULTAAT ( 32768?
6033:10 26        54          BPL  KLAAR
6035:8A           55          TXA            A-REGISTER=0, CARRY=SET
6036:E5 3E        56          SBC  A2L       TREK LSB ER VANAF
6038:85 3E        57          STA  A2L
603A:8A           58          TXA            A-REGISTER=0
603B:E5 3F        59          SBC  A2L+1     TREK MSB ER VANAF
603D:30 1C        60          BMI  KLAAR     $8000 INGETIKT?
603F:85 3F        61          STA  A2L+1     NEE,
6041:20 48 F9     62          JSR  PRBLNK    GEEF 3 SPATIES,
6044:A9 AD        63          LDA  #$AD      PRINT ALVAST "-"
6046:20 ED FD     64          JSR  COUT
6049:B0 DF        65          BCS  HEX2      EN PRINT REST VAN NEGATIEVE NOTATIE
604B:             66 ;
604B:             67 ;DEC-HEX CONVERSIE
604B:A9 A4        68 DEC      LDA  #$A4
604D:20 ED FD     69          JSR  COUT      PRINT "$"
6050:20 67 DD     70          JSR  FRMNUM    CONVERTEER INVOER NAAR FAC
6053:20 52 E7     71          JSR  GETADR    MSB IN A EN LINNUM+1
6056:A6 50        72          LDX  LINNUM    LSB
6058:20 41 F9     73          JSR  PRNTAX    UITVOER RESULTAAT
605B:20 D0 03     74 KLAAR    JSR  $3D0      TERUG NAAR APPLESOFT

*** SUCCESSFUL ASSEMBLY: NO ERRORS
```

```
49 54 MLIST
SCR # 49
  0 ( HEX/ASCII-DUMP 1                              GERT KLEIN          )
  1 HEX  0  VARIABLE  ENDAD    0  VARIABLE  POINTER
  2 ( U. PRINTS AN UNSIGNED 16 BIT NUMBER )
  3 :  U.   0   D.   :
  4
  5 ( FETCHBYTE FETCHES A BYTE FROM ADRESS IN POINTER )
  6 :   FETCHBYTE  POINTER   @   C@   :
  7
  8 ( .0 PRINTS n ZERO'S )
  9 : .0   0   DO   30   EMIT  LOOP   :
 10
 11 ( .ROW PRINTS INDEX ROW ON TOP OF DUMP )
 12 :  .ROW  5  SPACES  10  0  DO  I  .  SPACE   LOOP  CR  :
 13
 14 ( CHECK IF BYTE IS A PRINTABLE ASCII CHARACTER )
 15 : ?ASCII  7F  AND  DUP  7F  (  OVER  1F  )  AND  :    -->


SCR # 50
  0 ( HEX/ASCII-DUMP 2                              GERT KLEIN          )
  1 ( PRINT 16 BIT ADRESS WITH LEADING ZERO'S )
  2 : .POINTER  POINTER  @
  3       DUP  10    (  OVER  FFFF  )  AND  IF  3  .0  ENDIF
  4       DUP  100   (  OVER  F     )  AND  IF  2  .0  ENDIF
  5       DUP  1000  (  OVER  FF    )  AND  IF  1  .0  ENDIF
  6       U.  :
  7 ( PRINT 16 HEX BYTES )
  8 : .HEXROW  10  0
  9     DO
 10        FETCHBYTE  DUP  10  (
 11        IF
 12         30 EMIT     ( PRINT LEADING ZERO  )
 13        ENDIF
 14        .  1  POINTER  +!   ( INCREMENT POINTER  )
 15     LOOP  :              -->


SCR # 51
  0 ( HEX/ASCII DUMP 3                              GERT KLEIN          )
  1 ( PRINT 16 ASCII CHARACTERS. IF NOT PRINTABLE OUTPUT DOT )
  2 : .ASCROW
  3    POINTER  @  10  -  POINTER  !  ( POINTER TO BEGIN OF LINE )
  4    3  SPACES  10  0
  5      DO
  6        FETCHBYTE  ?ASCII
  7        IF
  8          EMIT              ( PRINT ASCII CHARACTER  )
  9        ELSE
 10          DROP  2E  EMIT    ( PRINT DOT  )
 11       ENDIF
 12       1  POINTER  +!      ( INCREMENT POINTER  )
 13     LOOP
 14   POINTER  @  ENDAD  @  )  :  ( ENDS WITH FLAG ON STACK )
 15  -->


SCR # 52
  0 ( HEX/ASCII-DUMP 4                              GERT KLEIN          )
  1 ( PRINT HEXDUMP ON CURRENT I/O DEVICE )
  2 : HEXDUMP  ENDAD  !  POINTER  !  CR CR  [COMPILE]  HEX  .ROW
  3        BEGIN
  4           CR  .POINTER  .HEXROW  .ASCROW
  5           ?TERMINAL                          ( BREAKKEY TEST  )
  6           IF
  7             DROP  1      ( SETS TRUE FLAG  )
  8           ENDIF
  9        UNTIL              ( TERMINATE IF FLAG TRUE  )
 10    CR  :
 11
 12 ( PRINT HEXDUMP ON PRINTER )
 13 : PHEXDUMP  PRAAN  HEXDUMP  PRUIT  :
 14
 15  :S
```

```
SCR # 53
  0 ( GLOSSARY HEX/ASCII-DUMP                GERT KLEIN          )
  1 U.         ( n -- )
  2            Print an unsioned 16 bit number.
  3 FETCHBYTE  ( -- byte )
  4            Get byte from adress in POINTER
  5 .0         ( n -- )
  6            Print n zero's.
  7 .ROW       ( -- )
  8            Print index row on top of dump.
  9 ?ASCII     ( ch -- ch f )
 10            Set true flag if value of ch is between $20 and
 11            $7E. else false flag.
 12 .POINTER   ( -- )
 13            Print adress in variable POINTER with leading
 14            zero's.
 15

SCR # 54
  0 ( GLOSSARY HEX/ASCII-DUMP                GERT KLEIN          )
  1 .HEXROW    ( -- )
  2            Print 16 hexbytes in the range of adress in variable
  3            POINTER to POINTER + 16.
  4 .ASCROW    ( -- f )
  5            Print 16 ASCII characters in the range of acress in
  6            variable POINTER to POINTER + 16. Non printing
  7            characters are represented by a dot. Flag indicates
  8            if POINTER ) ENDAD.
  9 HEXDUMP    ( adr1 adr2  -- )
 10            Print hex/ascii dump between adr1 and adr2. Terminate
 11            on terminal break. Adr1 and adr2 may be entered
 12            both in hex or in decimal. The dump is outputted in
 13            hex. After termination HEX is the present number base
 14 PHEXDUMP   ( adr1 adr2  -- )
 15            Print dump on printer.

OK
```

Fabelachtig printen in kleur of zwart|wit

OKIMATE 20

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